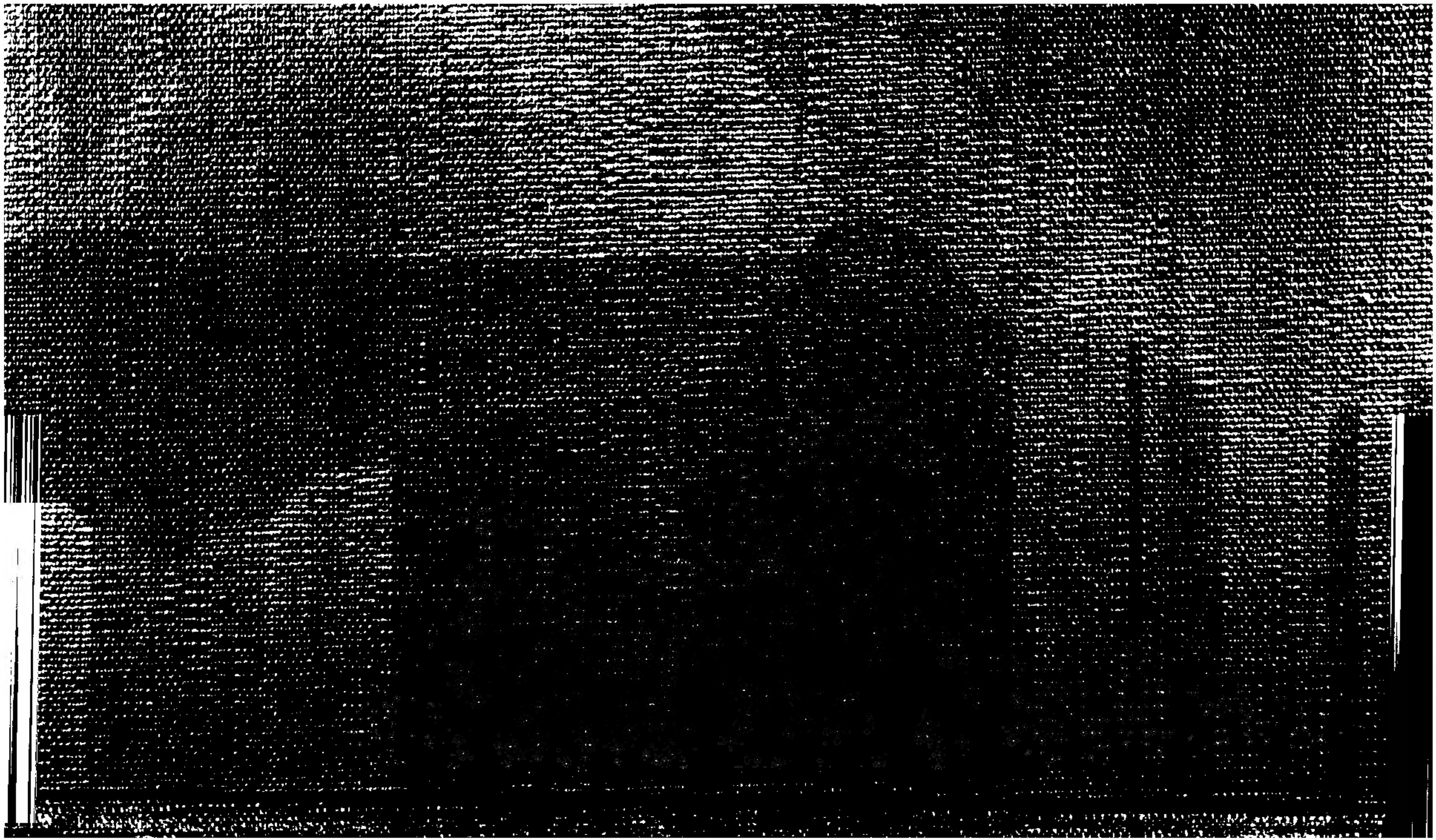

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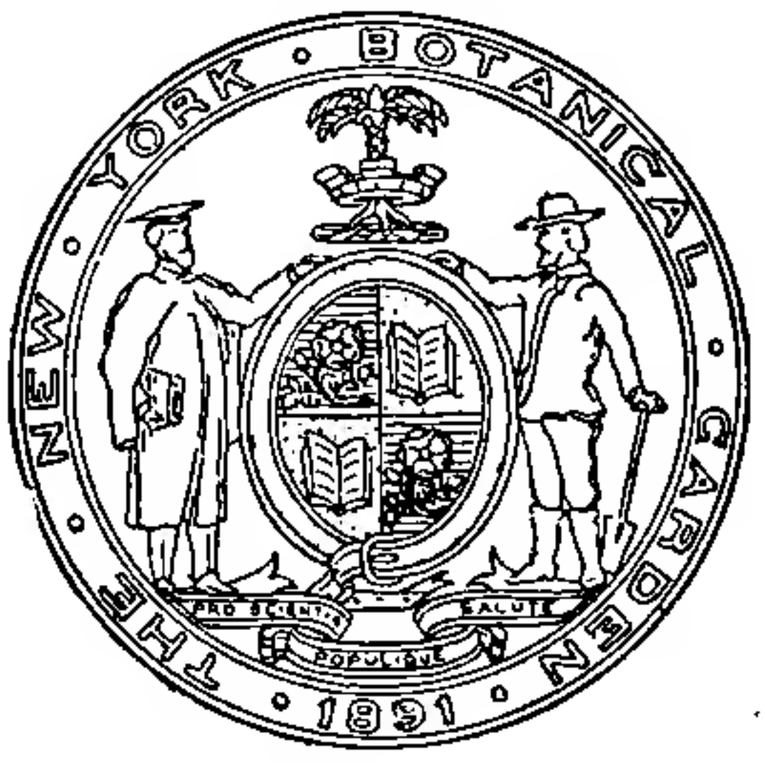

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The New York Botanical Garden

EDITOR

KENNETH ROWLAND BOYNTON

Head Gardener's Assistant

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Pine woods along bay west of Apalachicola, Florida. The habitat of the crow-foot prickly-pear. Photo by R. M. Harper.

JOURNAL

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VOL. XIX January, 1918 No. 217

COLLECTING PRICKLY-PEARS AT APALACHICOLA

(WITH PLATE 208)

On my way north after a cruise to the Cape Sable region of Florida,* in April 1916, I took occasion to make a side trip to Apalachicola in response to a former request by Dr. Britton, for the purpose of hunting for certain kinds of cactus. As recorded in a previous† paper, an intended visit to Apalachicola, had been frustrated by a period of cold weather.

At this time, however, the weather conditions were as favorable as could be desired. After leaving Miami there was no uncomfortable drop in the temperature, and I duly reached Jacksonville without incident. Late in the afternoon I left there for River Junction, which is on the Apalachicola River about two hundred miles westward. As a result of the heavy traffic of the winter season and a consequent uneven roadbed, we bounced along over the rails, sped through blinding clouds of dust and sand, due primarily to a prolonged drought and a dirt-ballasted track, and at two o'clock in the morning reached River Junction. About daybreak I learned that the only daily passenger train did not leave for Apalachicola until late in the afternoon. However, I found a special freight train preparing to make the run, and promptly boarded it. On it, one had the choice of all the luxuries afforded by worn-out flat-cars, box-cars, a cattle-car, and a piece

[JOURNAL for December, 1917 (18): 257–291 was issued February 7, 1918.]

* JOURNAL OF THE NEW YORK BOTANICAL GARDEN, 17: 189–202. 1916.

† JOURNAL OF THE NEW YORK BOTANICAL GARDEN, 18: 237–246. 1917.

of one of the primitive passenger-cars of the Long Island Railroad hitched on behind in place of a caboose.

Numerous stops along the way offered fine opportunities for collecting specimens. After ten hours consumed principally in stopping and starting the train, we covered the eighty miles, entering Apalachicola over a burning trestle.

The sight of the hammocks and the river-swamps along the way, aside from other natural features, was alone worth the trip. The shrubs and trees had put out their new and fresh foliage, and the shades and masses of green were indescribably beautiful. The low and the high pine woods were conspicuous with a wealth of spring flowers.

Apalachicola is an isolated town. It lies at the mouth of the Apalachicola River and faces Apalachicola Bay. The nearest trunk railroad is eighty miles to the north. The neighboring towns on the coast are each about twenty-five miles distant, one to the east, the other to the west. The town is situated on a dune-like ridge built up mainly of sand and of oyster-shells. In the earlier half of the last century it ranked third among the ports of our Gulf coast. This one-time prominence of the town was evidently the primary reason for my visit to it.

Thomas Drummond, who had been assistant naturalist on the second Land Arctic Expedition under Sir John Franklin and had collected extensively in Canada, after making collections in Texas started for further work in Cuba. He presumably sailed from some port, perhaps Galveston, in Texas, and when the boat touched at Apalachicola he found a prickly-pear which apparently had not previously been referred to in botanical literature. It was Drummond's intention to return from Cuba to explore Florida, but he died at Havana in March, 1835, not many weeks after his arrival there.

In 1841 Robert Graham, after describing *Opuntia Drummondii*,* published this note: "Plants of the species now described were received both at the Botanic Garden, Edinburgh, and by Dr. Neill, Canonmills, from Dr. Drummond, in 1835. They were gathered by him in Apalachicola, and flowered with Dr.

* The Botanist, 5: *pl. 246.*

Neill (and with him, and at the Caledonian Horticultural Society's Garden, only, as far as I know), in July, 1838 and 1839."

Notwithstanding a good description and an excellent colored plate accompanying it, *Opuntia Drummondii* was nearly or quite lost sight of for three quarters of a century. Apalachicola became the permanent residence of Dr. A. W. Chapman, for many years the leading botanist of the Southern States, in 1846. Unaware of what Mr. Graham had published in 1841, Dr. Chapman described the same plant already named, in manuscript, *Opuntia Pes-Corvi* by Dr. Le Conte, and published it under that name in 1860.* Chapman gave the geographical range as "barren sandy places along the coast of Florida and Georgia." There is a specimen, doubtless from Apalachicola, preserved in the Chapman Herbarium now at the Garden.

To rediscover this plant was the object of my visit to Apalachicola. Upon reaching the town I set out in search of cacti. I found some colonies of the kind particularly sought after on the banks of shells and sand facing the bay, while open lots and sandy fields were, or, rather, had been, literally carpeted with it. A large percentage of the plants had been killed by the cold spell described in a previous paper.† However, there were plenty of uninjured plants to furnish specimens; but the faded or blanched shell-like remains of the frozen joints were much more conspicuous and numerous than the live plants. It proved to be the same species as that from the coast of South Carolina about Charleston. It exhibited the same loose-jointed stems and the same facility for attaching its disarticulated joints to one's clothing. It is evidently primarily a sand-dune plant and apparently grows only, or at least thrives best, close to the shoreline.‡

This little prickly-pear was not the only *Opuntia* encountered. Two other interesting ones were found, the one a native species growing plentifully on the banks facing the bay, and more

* Flora of the Southern United States. 145.

† JOURNAL OF THE NEW YORK BOTANICAL GARDEN, 18: 237. 1917.

‡ A recent visit to the Columbia University greenhouse disclosed the fact that Professor R. A. Harper collected *Opuntia Drummondii* on the eastern coast of peninsular Florida as far south as Daytona in 1916.

sparingly elsewhere, and the large naturalized Indian-fig, *Opuntia Ficus-Indica*, which grew in large colonies in and out of the town.

Although the season was backward, the advent of spring was very evident. Native and naturalized plants were blooming in profusion. One seldom meets with as large a collection of plants exhibiting such a range in the color and the size of flowers, or such an intimately mixed aggregate of both cosmopolitan and rare and local species. Among the more beautiful, although often small, plants then in bloom, was the Florida toad-flax, *Linaria floridana*. It bears racemes of bright blue flowers and on first sight suggests a small lobelia. Many additional interesting and rare native herbaceous plants might be mentioned. However, as Mr. Drummond is the most prominent personality appearing in these notes, I may refer especially to the fact that the two very abundant naturalized plants with conspicuous flowers represented species he discovered in Texas just before he went to Apalachicola, and both of which were named in his honor, the one a phlox, *Phlox Drummondii*, and the other an evening-primrose, *Raimannia Drummondii*.

Both these species were published by Dr. William Jackson Hooker, while regius professor of botany in the University of Glasgow, in the *Botanical Magazine* under plates 3361 and 3441 respectively. After describing the phlox, Hooker says in a note: "Among the many interesting plants which attracted Mr. Drummond's attention during his journeyings in Texas, was the present very handsome species of *Phlox*. The seeds sent over, in the early part of the year 1835, soon vegetated, the plants blossomed most copiously, and with equal profusion and brilliancy of color, whether in the greenhouse or in the open border; and it bids fair to be a great ornament to the gardens of our country. Hence, and as it is an undescribed species, I am desirous that it should bear the name and serve as a *frequent* memento of its unfortunate discoverer, who shortly after quitting Texas, fell a victim of the climate of Cuba, in the prime of life, and just as he was on the point of exploring the botanical riches of that portion of the United States, which, next to Texas, held out the best prospect of rewarding his indefatigable exertions,

namely, Florida. He has, indeed, accomplished enough, by his zeal and researches, to secure to himself a lasting name throughout the botanical world: yet it is impossible not deeply to regret the loss, both as concerns our favorite science and his friends. He had made arrangements for a grant of land in the interior of Texas, so that his prospects for the maintenance of his family were brighter than ever; and he could not have failed, by the proximity of his intended residence to the hitherto unexplored mountains of North Mexico, to render yet greater service to that science to which he was so ardently devoted, and in the pursuit of which, he has thus fallen a sacrifice."

The word "frequent" in the above quotation is italicized in the original. Although Dr. Hooker did not intend to use it as foretelling the coming wide distribution and frequent occurrence of the phlox, and also of the evening-primrose, east of the Mississippi River, both as cultivated and naturalized plants, the force of the italics is quite striking and much more appropriate now. Dr. Hooker's prophetic reference to the "botanical riches" of Florida has been fully justified by subsequent collections made in that state, and particularly by recent exploration carried on there by the Garden and by others.

One might be tempted to believe that Mr. Drummond introduced these plants as he passed through Apalachicola on his way to Cuba, were it not for the fact that Dr. Chapman does not mention either plant in his "Flora," and he surely could not have overlooked them. Consequently we are forced to consider them of more recent introduction. Both of these showy plants have justly become very popular. They are widely cultivated and extensively naturalized in the eastern United States.

Among the naturalized shrubs a South American species, the weeping lantana, *Lantana Sellowiana*, attracted my attention, both on account of its ever-blooming habit and its immunity from cold. Neither its leaves nor its flowers had been damaged by the spell of cold weather that killed many other plants a short time before my visit. Most interesting among the native trees was a species of hickory. This tree may be without a botanical name or it may have rather recently been given a name, a point

I have not yet been able to determine. However, the trees particularly attract one's attention at first sight, on the one hand on account of their unusual habitat on the exposed banks along Apalachicola Bay, and on the other hand their habit of growing with the roots bathed in salt-water.

This excursion, and one to the coastal region of Charleston, South Carolina, described in a former note,* brought to light much interesting data. However, what impressed itself on me most forcibly in this instance, as in all my former experiences along the coast, was the slight knowledge we have of the flora of the entire coastal strip of the United States from Delaware to Texas inclusive. I was not prepared to make general collections of plants, but so much of interest presented itself that, with an improvised collecting outfit, I managed to gather and bring back a large and interesting series of specimens for the Garden herbarium.

JOHN K. SMALL

THE RELATIVES OF CATALPA TREES IN THE WEST INDIES

(WITH PLATE 209)

Certain interesting trees inhabiting Jamaica, Cuba, Hispaniola and the Bahamas have been botanically grouped, on account of their flowers and pods, in the genus *Catalpa*, and the object of this note is to maintain that they are thus erroneously classified, as already intimated by me.† Professor Grisebach had long previously indicated their differences from the typical Catalpas of eastern continental North America and Asia by grouping the Cuban species as a section of the genus, which he termed Macrocatalpa.‡ The first species of the group named botanically was recorded by Jacquin in 1760;§ he called it *Bignonia longissima* and referred to its earlier description and illustration by Plumier,‖

* JOURNAL OF THE NEW YORK BOTANICAL GARDEN, **18**: 237-246.

† Ill. Fl. N. States & Canada, Ed. 2, **3**: 238. 1913.

‡ Cat. Pl. Cub. 191. 1866.

§ Enum. Pl. Carib. 25.

‖ Cat. Pl. Amer. 5. Plant. Amer. 47, *pl.* 57. 1755.

under the name "Bignonia arbor, folio singulari undulato, siliquis longissimis & angustissimis." The tree described by Plumier was probably from Hispaniola. Sims, in 1808,* seeing that it was not a *Bignonia*, called it *Catalpa longissima*. Chamisso, in 1822, recording the tree as found at Cape Francais, Hayti,† printed the name *Catalpa longisiliqua*.

This tree inhabits dry districts at low elevations of the southern part of Jamaica, where it is called "French Oak" or "Spanish Oak," and its timber "Yoke Wood" or "Mast Wood," and occurs also in Haiti and Santo Domingo, in similar dry regions. Grisebach‡ records its occurrence on St. Thomas, but it is not known to grow on that island now and Baron Eggers did not know of it there in 1879.

Inasmuch as it is unknown in Porto Rico, Grisebach's record may be erroneous; there is a Parish of St. Thomas in Jamaica, which has sometimes been confused with the island St. Thomas. Professor A. S. Hitchcock§ recorded it as growing on Cat Island, Bahamas, in 1890, but at the time I visited that island with Dr. C. F. Millspaugh in 1907‖ we could find no trace of it, although we were guided over his exact route by a native who had accompanied him; Professor Hitchcock visited Jamaica subsequently to his landing on Cat Island and collected specimens of the tree there; I infer that there was a mixture of labels in his collection. Jamaica and Hispaniola are therefore the only certainly known islands inhabited naturally by the tree. A few years ago I saw a fine young plant of it growing at the Agricultural Station in Bermuda, brought from Jamaica, and a specimen collected by Father Duss on Martinique is labeled as perhaps introduced.

This tree attains a height of at least sixty feet and a trunk diameter of four feet, and its wood furnishes a very valuable timber;¶ it has smooth, slender-stalked, elliptic to lanceolate, thin leaves three or four inches long, which are narrowed or

* Bot. Mag. under *pl. 1094*.
† Linnaea 7: 720.
‡ Fl. Brit. W. I. 446.
§ Rep. Mo. Bot. Gard. 4: 114. 1893.
‖ Jour. N. Y. Bot. Gard. 8: 75–77.
¶ See W. Harris, Bull. Dept. Agric. Jam. 1: 27. 1911.

rounded at the base and usually long-pointed; its numerous, loosely clustered flowers, about three-quarters of an inch long, have a white corolla with a yellowish throat, and its drooping linear round pods are about a foot long and only about one-eighth of an inch in diameter.

The essential differences between this *Catalpa longissima* and our northern typical Catalpas are seen in its narrow leaves, and in its seeds, which are narrowly linear, long-attenuate at each end and densely clothed with long white hairs. The accompanying illustration (Plate 209) is from a photograph of a characteristic tree taken by Dr. Marshall A. Howe at Hope Gardens, Jamaica, in December, 1906.

The typical Catalpas have broad, ovate-orbicular leaves and their seeds have a flat wing which is fimbriate at the ends.

I accept the sectional name Macrocatalpa, published by Grisebach, as a generic name; the tree of Jamaica and Hispaniola would thus be called, botanically, **Macrocatalpa longissima** and be the type of the genus.

There are two congeners of this tree at present known. The one inhabits dry coastal parts of Cuba and Andros Island in the Bahamas; it was apparently first botanically described by A. Richard,* who, knowing it only from foliage and pods, classified it, doubtfully, in the family Apocynaceae, under the name *Echites* (?) *macrocarpa*, a name previously used, however, for an entirely different Asiatic plant by Wallich. Subsequent collections of its flowers showed the tree to be related to the "French Oak" of Jamaica, and it was redescribed by Grisebach in 1866 as *Catalpa punctata*.† This tree is much smaller than the "French Oak"; I have studied it at several points on the southern Cuban coast from Daiquiri, Oriente Province, to Cape Corrientes near the western end of Cuba, and also on the Isle of Pines; the largest plants seen by me were about 30 feet high, with a rough fissured bark and spreading branches. This **Macrocatalpa punctata,** has smooth or nearly smooth, leathery elliptic blunt, stout-stalked leaves two to three inches long, strongly netted-veined

* In Sagra, Hist. Cub. **11**: 94. 1850.

† Cat. Pl. Cub. 192.

The "French Oak" (*Macrocatalpa longissima*) at Hope Gardens, Jamaica.

on the underside; its flowers have a light yellow corolla with orange and brown markings in the throat, its lower lip 3-lobed, the middle lobe the largest. Its pods, as shown by specimens collected by me on the United States Naval Station at Guantanamo Bay, are a little more than two feet in length and about one sixth of an inch thick. The Cuban name for this tree is "Roble de olor."*

Specimens of a tree collected by Charles Wright at Bayamo, Oriente, Cuba, were described by Grisebach, under the name *Catalpa punctata pubescens;*† the leaves are densely villous-pubescent beneath, but whether this feature is associated with other differences from typical *punctata* or not, is not known. Bayamo is some miles north of the southern coast.

Another species, apparently of this genus, was described by Grisebach in 1866‡ under the name *Catalpa purpurea*, from specimens collected by Charles Wright on farallones at La Catalina, near Sagua de Tanamo, Cuba. Wright's field notes, preserved with a specimen in the Gray Herbarium of Harvard University, describe this plant as a bush six feet to ten feet high, the corolla-tube "deep purple on the back side, in front three deep red lines, then two yellow bands one on each side, then two more red lines, edge crumpled, very light purple." The leaves are oval or elliptic, long-stalked, densely netted-veined and pubescent beneath; the fruit is unknown. This plant may be named **Macrocatalpa purpurea.**

N. L. Britton

GROWING WALNUTS FOR FOOD

The time is opportune to impress upon all who own land the importance of growing nut trees. Americans should awake to the fact that an increasing number of nuts are being imported from Europe, at increased prices, whereas we should be exporting them. The value of nuts as a partial substitute for meat and other high-priced foods, containing as they do both protein and fat, is too well known to need repetition here.

* Roble is Spanish for oak.

† Cat. Pl. Cub. 192. 1866.

‡ Cat. Pl. Cub. 192.

Last September, Dr. W. C. Deming, secretary of the Northern Nutgrowers Association, gave a public lecture at the Garden on this subject and exhibited nuts grown on his farm at Georgetown, Conn. He is an expert and an enthusiastic believer in this kind of farming for many of our hilly districts and will gladly advise anyone how to make a beginning.

The walnut and pecan plantation of Mr. Littlepage, near Bowie, Maryland, was visited by the writer last October and he was shown a great collection of grafted pecans, English walnuts, and Stabler black walnuts, all of them too young as yet to bear fruit. Several forms of grafting and budding were employed, the annular bud being much used and very successful. Methods of top-working old trees were described and shown to be both practical and comparatively cheap. The Stabler black walnut is a recent discovery and is valuable because so prolific and because the kernel comes out whole, although it is smaller than in the native black walnut. Machines for cracking the nuts are already in use and it may be that some day there will be central plants for taking over nuts and cracking them, as there are now central mills for sugar and cotton.

Walnut trees should be extensively planted: the native black walnut and the Stabler black walnut for timber, for fruit, and for grafting; and the Persian, or "English," walnut for fruit, timber, shade, and ornamental purposes. The pecan is a very valuable nut tree for the southern states, but can hardly be recommended for states very far north of Virginia.

The Persian Walnut

The Persian walnut, *Juglans regia*, originated in southern Europe by chance selection through several centuries from a wild tree which bore small nuts of very inferior quality. The commercial nuts were brought to England and called "walnuts," meaning "foreign nuts," and the name "English walnut" became current in America because they reached this country from England.

This valuable tree now thrives in many parts of the world and its range is ever increasing. If plant breeders will only awake to

their opportunities and use the various excellent varieties already found for further carefully planned experiments, the results will be astonishing. California has made a good beginning in this direction, which eastern plant breeders would do well to imitate. Not only the walnut, but many other wild trees furnish attractive problems which promise excellent practical results. The kind of work done by Mayette at Grenoble, France, should be duplicated many times over in this country.

Persons planting the Persian walnut have often used seedling trees instead of grafted stock, for which there is no longer any excuse. Also, one must be careful to get late-flowering varieties that will not be killed by frost. Certain reliable dealers will furnish the best trees the market affords and give directions for planting and cultivation. The vigorous roots of the native black walnut make an excellent stock for the Persian walnut graft, if the technique of this particular kind of grafting or budding is learned from an expert. This, also, is a very interesting field for experiment.

W. A. MURRILL

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued.)

Berberis. BARBERRY

Berberis amurensis. AMUR BARBERRY.

Location; Fruiticetum.

Natural distribution: Manchuria and northern China.

Berberis aristata. SPINE-TOOTHED BARBERRY.

Location: Fruticetum.

Natural distribution: Himalayan Region.

Berberis brevipaniculata. SHORT-CLUSTERED BARBERRY.

Location: Fruticetum.

Natural distribution: China.

Berberis buxifolia. BOX-LEAVED BARBERRY.

Location: Fruticetum.

Natural distribution: Chili.

Berberis buxifolia var. **nana.** DWARF BOX-LEAVED BARBERRY.
Location: Fruticetum.

Berberis cerasina. CHERRY-COLORED BARBERRY.
Location: Fruticetum.
Hybrid.

Berberis concinna. NEAT BARBERRY.
Location: Fruticetum.
Natural distribution: Himalayan Region.

Berberis diaphana. SCARLET BARBERRY.
Location: Fruticetum.
Natural distribution: Western China.

Berberis emarginata. NOTCHED BARBERRY.
Location: Fruticetum.
Hybrid.

Berberis Poireti. POIRET'S BARBERRY.
Location: Fruticetum.
Natural distribution: Northern China and Amurland.

Berberis Prattii. PRATT'S BARBERRY.
Location: Fruticetum.
Natural distribution: Western China.

Berberis Regeliana. REGEL'S BARBERRY.
Location: Fruticetum.
Natural distribution: Japan.

Berberis sibirica. SIBERIAN BARBERRY.
Location: Fruticetum.
Natural distribution: Siberia.

Berberis Sieboldii. SIEBOLD'S BARBERRY.
Location: Fruticetum.
Natural distribution: Japan.

Berberis Thunbergii. THUNBERG'S BARBERRY.
Location: Fruticetum. North end of Lake Bridge. South Gate. Near east end of Long Bridge. Depot Plaza. Near Power House 1.
Natural distribution: Japan.

Berberis Thunbergii var. **Maximowiczii.** MAXIMOWICZ'S BARBERRY.
Location: Fruticetum.

Berberis Thungerbii var. **minor.** THUNBERG'S DWARF BARBERRY.

Location: Fruticetum.

Berberis vulgaris. COMMON BARBERRY.

Location: Fruticetum.

Natural distribution: Europe to eastern Asia.

Berberis vulgaris var. **atropurpurea.** PURPLE-LEAVED COMMON BARBERRY.

Location: Fruticetum.

Berberis vulgaris var. **macrocarpa.** LARGE-FRUITED COMMON BARBERRY.

Location: Fruticetum.

Berberis vulgaris var. **sulcata.** FURROWED COMMON BARBERRY.

Location: Fruticetum.

Mahono-berberis. BI–GENERIC HYBRID

Mahono-berberis Neuberti. NEUBERT'S BARBERRY.

Location: Fruticetum.

MAGNOLIACEAE. Magnolia Family

Magnolia. MAGNOLIA

Magnolia acuminata. CUCUMBER TREE.

Location: Arboretum.

Natural distribution: Southeastern United States.

Magnolia denudata. YULAN MAGNOLIA.

Location: Arboretum.

Natural distribution: Central China.

Magnolia Fraseri. LONG-LEAVED UMBRELLA TREE.

Location: Arboretum.

Natural distribution: Southeastern United States.

Magnolia Kobus. Thurber's Magnolia.

Location: Arboretum. Fruticetum.

Natural distribution: Japan.

Magnolia liliflora. LILY-FLOWERED MAGNOLIA.

Location: Fruticetum. Arboretum.

Natural distribution: China and Japan.

Magnolia liliflora var. **nigra.** BLACK LILY-FLOWERED MAGNOLIA.
Location: Arboretum.

Magnolia macrophylla. LARGE-LEAVED UMBRELLA TREE.
Location: Herbaceous Grounds.
Natural distribution: Southeastern United States.

Magnolia obovata. WHITE-LEAVED JAPANESE MAGNOLIA.
Location: Arboretum.
Natural distribution: Japan.

Magnolia Soulangeana. SOULANGE'S MAGNOLIA.
Location: Arboretum. Fruticetum.
Hybrid.

Magnolia Soulangeana var. **alba superba.** SOULANGE'S WHITE MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **Alexandrina.** ALEXANDRINE MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **Lennei.** LENNE'S MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **Norbertiana.** NORBERT'S MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **Niemetzii.** COLUMNAR HYBRID MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **rustica.** DARK PURPLE MAGNOLIA.
Location: Arboretum.

Magnolia Soulangeana var. **speciosa.** SOULANGE'S STRIPED MAGNOLIA.
Location: Arboretum.

Magnolia stellata. HALL'S MAGNOLIA.
Location: Fruticetum. Arboretum.
Natural distribution: Japan.

Magnolia tripetala. UMBRELLA TREE.
Location: Arboretum. Herbaceous Grounds.
Natural distribution: Southeastern United States.

Magnolia virginiana (*Magnolia glauca*). SWEET BAY.
Location: Arboretum. Fruticetum. Economic Garden.
Natural distribution: Southeastern United States.

Magnolia Watsonii. WATSON'S MAGNOLIA.
Location: Arboretum. Fruticetum.
Natural distribution: Japan.

Liriodendron. TULIP TREE

Liriodendron Tulipifera. TULIP TREE.
Location: Arboretum. At 200th St. entrance. Near fountain, foot of Museum approach. Along driveways, Museum approach. Wild: common.

Liriodendron Tulipifera var. **fastigiata.** COLUMNAR TULIP TREE.
Location: Arboretum.

CALYCANTHACEAE. Strawberry-shrub Family

Calycanthus. STRAWBERRY SHRUB

Calycanthus floridus. HAIRY STRAWBERRY SHRUB.
Location: Fruticetum.
Natural distribution: Southeastern United States.

CONFERENCE NOTES FOR DECEMBER

The monthly conference of the scientific staff and registered students of the Garden for December was held on the afternoon of the 5th.

Miss Helene M. Boas reported regarding the occurrence of sugary excretions of the Douglas spruce. Specimens obtained last summer from Spence's bridge, British Columbia, were exhibited showing accumulation of sugary deposits on leaves, branches and cones. A full report regarding this phenomenon with illustration is planned for a future number of the JOURNAL.

Dr. Murrill reviewed his article on hybrid chestnuts published in the October number of the JOURNAL and exhibited specimens obtained from Dr. Van Fleet.

He then discussed rather broadly the nut and timber situation

in the eastern United States as affected by the chestnut canker, and various experiments undertaken by Dr. Van Fleet, Dr. Robert Morris, and others to relieve the situation by the production of immune hybrids.

Dr. Murrill concluded his remarks with the following summary:

1. The chestnut canker has spread like a whirlwind through our forests and, so far, not a single immune native tree has been discovered. The European chestnut is also non-resistant. It may be that there exists somewhere in the world unknown to science a timber tree of this genus which is immune to the canker. If so, it would be a great boon to the timber industry and it is our duty to find it, as there is really no tree that can take the place of the chestnut.

2. The most hopeful prospect so far as timber is concerned at present lies in producing immune hybrids of erect, tree-like growth and proportions. Dr. Van Fleet suggests a cross between the Japanese and Chinese chestnuts; Dr. Morris a cross between the Japanese tree and the arboreal form of the chinquapin.

3. The nut-growing proposition is much more hopeful and seems to have been practically solved by a hybrid between our native chinquapin and the most highly resistant of the Japanese chestnuts. There is also hope of other hybrids which might produce larger and better nuts.

A. B. STOUT,
Secretary of the Conference.

SPRING INSTRUCTION IN GARDENING

The courses of instruction in home gardening and in the training of teachers for school gardens commenced last spring, in cooperation with the International Children's School Farm League, will be repeated this year, with but slight modifications, in the lecture-room and workrooms at the Mansion and at the School Garden nearby, under the direction of Mr. Henry G. Parsons, Supervisor of Gardening Instruction. In order to offer instruction as early as possible in the season, a course of four lectures

and accompanying demonstrations will be commenced on the afternoon of Monday, March 4th, at three o'clock, and continued on Mondays, March 11th, 18th, and 25th.

The fee for this course will be $5.00, which will include necessary supplies and material.

Talks:

Soil and preparation.

Cultivation and weed control.

What and how to plant. Transplanting. Food values.

Relation of sunlight, air, and water to the garden.

Garden Practice, and Observation:

Planting, transplanting, thinning, spading, raking, hoeing, cultivating, weeding.

The garden practice portion of the instruction will be given in one of the propagating greenhouses.

Other courses to be arranged for April, May and June will be announced subsequently.

NOTES, NEWS AND COMMENT

Miss Elsie M. Kittredge has recently been appointed an assistant curator and the very large and valuable collection of lantern slides and negatives has been placed in her care; she has had long experience in making and coloring photographs and lantern slides: the Garden collection has become so extensive as to demand one person's constant attention. Copies of colored photographs by Miss Kittredge illustrating wild flowers needing protection have been framed and hung in the Mansion.

A specimen of *Cycloporus Greenei* (Berk.) Murrill has recently been given to the Garden by Miss Eleanor Hodges, who collected it several years ago under rhododendrons at Pocono Manor, Pennsylvania. Miss Hodges knew that it was a rare fungus and was surprised to find it four or five times in different places in the vicinity of Pocono Manor. This interesting species is represented in the Garden herbarium by sporadic collections from

New England to the mountains of North Carolina and west to Iowa, but Miss Hodges's collection is the first we have received from the state of Pennsylvania.

Crinum americanum, the only member of the genus found in the United States, has bloomed during the month of January in house 9, conservatory range 1. This aquatic plant, with large white perianths and red and yellow stamens, was described, and illustrated in colors in *Addisonia*, plate 11 (vol. 1, no. 2).

A species of *Clivia*, the *Imantophyllum* of gardeners, from Cape Colony began to bloom about January 20. This plant, *C. nobilis*, bears large clusters of tubular, yellowish green flowers, and strap-like, evergreen leaves. The flowers are delicate in coloring and are pendulous, while those of *C. miniata*, another well-known greenhouse plant, are brighter colored and erect.

Mr. J. E. Fries, of Birmingham, Alabama, called at the Garden on January 21 with a handsome specimen of the parasitic gill-fungus, *Asterophora Clavus*, preserved in alcohol, which he donated to the Garden collection. While here, he took a full subscription to *North American Flora*.

On January 22, about 240 biology pupils from Evander Childs High School, accompanied by Mr. Paul B. Mann and several other biology teachers, came to the Garden to study the conservatory collections and attend an illustrated lecture on Forestry by Mr. George E Hewitt A snowstorm interfered somewhat with the attendance.

More than a hundred specimens of lichens from the Yukon region collected in 1898 and 1899 by Mr. R. S. Williams have been given to the Garden by the collector. A large set of the flowering plants and mosses collected in the Yukon by Mr. Williams at the same time he gathered the lichens were incorporated in the Garden herbarium about fifteen years ago.

A collection of several dozen specimens of edible fruits from the interior of Colombia has recently been added to the economic museum collection. These specimens were acquired by Dr. Rusby last summer.

Volume 21, part 3, of *North American Flora*, by P. C. Standley, containing descriptions of Allioniaceae, appeared January 22, 1918.

Professor C. R. Orton, of the Pennsylvania State College, recently spent a few days at the Garden working on the collections of certain parasitic fungi.

Dr. J. R. Weir, of Montana, recently spent several days looking over the Garden collections of fungi. Dr. Weir is especially interested in the diseases of forest trees.

Meteorology for December.—The total precipitation for the month was 3.87 inches, of which 1.4 inches (14 inches snow measurement) fell as snow. The maximum temperatures recorded at the Garden for each week were 42° on the 5th; 34° on the 13th, and *45° on the 21st and the 24th.* Minimum temperatures were 11° on the 10th, 3° on the 11th, 8° on the 23d, and *—10° on the 30th.*

Meteorology for the Year 1917.—The total precipitation at the New York Botanical Garden for the year was 32.07 inches. The distribution by months was as follows: January, 3.30 (including 9 inches of snow); February, 2.57 (including 13 inches snow); March, 3.71 (including 10 inches snow); April, 1.68 (including 2½ inches snow); May, 2.73; June 3.57; July, 2.30; August, 0.81; September, 1.62; October, 5.15; November, 0.76; and December, 3 87 (including 14 inches snow).

The maximum temperature recorded for the year was 100° on the 30th and the 31st of July. The minimum was —10° on the morning of December 30. The first hard-killing frost of the autumn was on the night preceding the 31st of October.

ACCESSIONS

MUSEUMS AND HERBARIUM

37 specimens of flowering plants from the Himalaya Mountains. (By exchange with Dr. Ralph R. Stewart.)

110 specimens from Jamaica, West Indies. (Collected by Mr. William Harris.)

200 specimens "Plantae Exsiccatae Grayanae," Centuries 2 and 3. (By exchange with Harvard University.)

142 specimens of flowering plants from Washington. (By exchange with Harvard University.)

5,460 specimens of flowering and flowerless plants from southern Florida. (Collected by Dr. J. K. Small.)

366 specimens of flowering plants from California. (By exchange with the California Academy of Sciences.)

51 specimens of flowering plants from central Europe. (By exchange with Harvard University.)

45 specimens of edible fruits from Colombia. (Acquired by Dr. H. H. Rusby.)

278 specimens of carices from North America. (By exchange with Harvard University.)

2 specimens of hepaticae from Massachusetts. (By exchange with Miss Annie Lorenz.)

7 specimens of marine algae from South America and Alaska. (By exchange with the United States National Herbarium.)

147 specimens of marine algae from Cuba (Tomas Barrera Expedition). (By exchange with the United States National Herbarium.)

451 specimens of flowering plants from Washington. (Collected by Dr. S. M. Zeller.)

350 specimens of flowering plants from Alaska. (By exchange with Mr. J. P. Anderson.)

148 specimens of flowering plants from California. (Collected by Mrs. Roxana S. Ferris.)

16 photographs of plant models. (By exchange with the Field Museum of Natural History.)

1 specimen of *Cycloporus Greenei* from Pennsylvania. (By exchange with Miss Eleanor Hodges.)

140 specimens of fungi from Porto Rico. (By exchange with Professor J. A. Stevenson.)

16 specimens of fungi from New Jersey. (By exchange with Mr. C. A. Schwarze.)

1 specimen of *Hydnum pulcherrimum* from Louisiana. (By exchange with Professor A. T. Bell.)

5 specimens of fungi from New York. (By exchange with Mr. Stewart H. Burnham.)

2 specimens of *Tricholoma* from North Carolina. (By exchange with Professor W. C. Coker.)

6 specimens of polypores from Oregon. (By exchange with Professor C. E. Owens.)

3 specimens of fungi from Louisiana. (By exchange with Professor A. T. Bell.)

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Vol. 3, part 1, 1910. Nectriaceae—Fimetariaceae.

Vol. 7, part 1, 1906; part 2, 1907; part 3, 1912. Ustilaginaceae—Aecidiaceae (pars). (Part 1 no longer sold separately.)

Vol. 9 (now complete), parts 1 and 2, 1907; part 3, 1910; part 4, 1915; parts 5, 6, and 7, 1916. Polyporaceae—Agaricaceae (pars). (Parts 1 and 2 no longer sold separately.)

Vol. 10, part 1, 1914; parts 2 and 3, 1917. Agaricaceae (pars).

Vol. 15, parts 1 and 2, 1913. Sphagnaceae—Leucobryaceae.

Vol. 16, part 1, 1909. Ophioglossaceae—Cyatheaceae (pars).

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OF

The New York Botanical Garden

EDITOR

KENNETH ROWLAND BOYNTON

Head Gardener's Assistant

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JOURNAL

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The New York Botanical Garden

VOL. XIX February, 1918 No. 218

NARRATIVE OF A TRIP TO SOUTH AMERICA FOR COLLECTING CACTI*

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF:

Sir: Pursuant to your commission to go to South America to collect representative material of the various cacti that I might encounter in the different places visited, I sailed from New York on the *S. S. Byron*, November 4, 1916, arriving at Buenos Aires on the evening of November 28, after an uneventful voyage. On the way down we stopped for a portion of a day at Rio de Janeiro, thus enabling me to call on Dr. Alberto Löfgren, of the Botanical Garden there. The Doctor received me most cordially and promised to prepare a collection of living *Rhipsalis* for the New York Botanical Garden, should I call for it on my return north; I, in return, was to send him material of the various *Rhipsalis* that I might collect on this trip, which indeed I was glad to do, as the Doctor is probably the best authority on this genus at the present time. Having a letter of introduction to Mr. H. Hussy, general manager of the Central and South American Telegraph Company, I called on him the first thing next morning. The nature of my visit seemed quite a novelty to him and he took the most kindly interest in my welfare, giving me valuable information of use in getting about the city and accompanied me to many places. His son Harry also frequently acted as my guide

* The preparation of this report has been much delayed by the long-continued illness of the late Dr. Shafer. It is now published as a record of an important expedition which yielded very valuable information for the monograph of Cactaceae by Dr. Britton and Dr. Rose, now in course of publication by the Carnegie Institution of Washington.

and interpreter. His keen interest in my welfare was later shown, when after my not returning to Buenos Aires at the time I was supposed to, he started a consulary inquiry after me. I had a considerable contribution of herbarium material as a compliment of the Garden to our friend, Prof. Cristobal M. Hicken, of the Facultado de Ciencias Exactas Fiscias y Naturales. Professor Hicken, however, was out of town and not expected to return for several days, which gave me ample opportunity to secure maps and other much needed data and to see much of this remarkable city. Its many parks and numerous well-kept plazas are a conspicuous feature and must do much to brighten the lives of the inhabitants. The streets of the city are very wide and well kept, many of them being provided with a line of shade trees along each curb. A native tree of the *Cassia* family, at this season almost entirely covered with golden yellow flowers, made some of the streets appear quite gorgeous. Another native tree, a member of the *Bignonia* family, heavily laden with bright blue flowers was also a conspicuous feature. Probably the most used trees, however, are the European plane or sycamore tree, our own box elder, and the oriental *Ailanthus.* The Botanical Garden, whose area is unfortunately far too small, is most interesting and instructive. Many plants and large trees from every continent are here to be seen. Quite a novelty to me was the assemblage of many of our northern trees in close proximity with the *Eucalypti* and *Mimosaceae* of Australia.

Having left a note for Dr. Hicken announcing my presence in Buenos Aires, he called at the hotel a day or two after his return to the city. He seemed much pleased that the study of South American cacti was to be continued by Doctors Britton and Rose, and gave me letters to various persons who he thought would be helpful, also much advice and information, without which I would have been quite helpless. He also advised me to begin my work at Andalgala, in the province of Catamarca, not only because it was a typical cactus region, but also on account of the fact that a Danish naturalist, Mr. P. Jörgensen resided there. Mr. Jörgensen had made a large collection of the plants of the region for Dr. Hicken's herbarium and the probability

that he would be more or less at leisure at this season, it was thought, would greatly further the progress of my work. Accordingly I started for Andalgala on the night of December 11. This proved to be a long and irksome trip. The railways of Argentina, once you get some distance from the capital, are not calculated to inspire one's confidence or to induce one to travel unnecessarily. Their roadbeds, each system of which is of a different gage, are poorly constructed, miserably ballasted and usually a single track. The sleeping cars, which are scarcely more than compartments of bunks arranged transversely with some upholstery and hard wood embellishments, are anything but comfortable. No provision is made for its occupants to sit comfortably during the day time. For this one must go to the day coach or the dining car. The dining car which is attached to all through trains and remains with it during the entire trip, is the only redeeming feature of an Argentina railroad, being neat and comfortable, a first-class restaurant on wheels and one can obtain most anything desired. Their table d'hote meals are very satisfactory.

Next morning found us moving through a monotonously flat region, composed of large grain fields and pasture land, situated northwest of Rosario, the second largest town of the Republic. Conspicuous here were the blanched bones of innumerable cattle which had perished from hunger and thirst during the long and severe draught which the region had suffered. Although it was Sunday many threshing machines, belching forth huge clouds of straw and dust, were passed during the entire day. The region is entirely devoid of native trees and the inhabitants, it would seem, have yet to learn the art of tree planting. The most conspicuous vegetation along the route is the wild carrot and a very large artichoke-like thistle. Woody plants, seemingly, were entirely absent until near the close of the day, when scattered shrubbery appeared. We reached Alto Cordoba on the highlands opposite that city about dark and thence continued through the night a hot, dusty and suffocating ride northward. Early next morning found us moving through a weird and desolate desert landscape composed of alternating tracts of stunted trees

and shrubbery, among which cacti were discernible, and gray saline areas, the dust of which filled the coaches almost to suffocation. After passing La Rioja we continued on through the same monotony and desolation except near Mazan where a low rocky ridge was crossed. This was a veritable cactus garden which I was loath to pass without stopping. A number of varieties were noticed that were not seen elsewhere. The inaccessibility, however, made it impossible for me to return to this interesting place.

Andalgala, the village of which is situated three or four kilometers from the railroad station, was reached sometime after dark on the third night out from Buenos Aires. I secured accommodations which consisted of a large, fairly well ventilated room facing an ample but none too cleanly patio which promised to afford very good facilities for my work. Early next morning I started out to find Mr. Jörgensen, but I learned that he had been out of town for some time, and I could not ascertain when he was expected back. As one of Dr. Hicken's reasons for advising me to begin my work at Andalgala was Mr. Jörgensen's knowledge of the region and its plants and the fact that he spoke English, I was very much disappointed and the fact that the people did not seem to understand my poor Spanish, especially as many of the words, particularly the nouns, were different than those I had learned in the West Indies, made me feel quite hopeless for the time being. The hotel man told me that he did not think there was a person in the neighborhood who spoke English and when I fell back on the German language his information was similar. Upon sounding the few guests at the hotel I discovered that a young man of Swiss extraction spoke German. He likewise informed me that he did not think there was an English-speaking person in the village and that the only two persons he knew of who spoke German were a Hollander with an office nearby and Dr. Schmidt, a physician residing in the outskirts of the town. Upon visiting the Hollander's office I learned that he was out of town and probably would not be back for several days. As it was probable that the Doctor would be out on his professional rounds at this hour of the day, I tried to

ignore my plight by taking a walk out into the country, the course I took leading me to and past the cemetery. I soon discovered that I was in a real cactus region, for not less than five species were observed on this walk. Returning to the hotel in time for the noon day's meal, my Swiss friend told me that he had met Dr. Schmidt and told him of my presence and intention in the region. The Doctor said he would be pleased to converse with me in either English or German and to help me in any way he could. After the meal the hotel man, upon my request for a boy to show me the way out to Dr. Schmidt's residence, advised me not to call on the Doctor until three o'clock, as he would probably be having his siesta, as is the custom here. I found the Doctor, who had been long in residence in Argentina, a very pleasant and highly scientific man of affairs. He became much interested in my work and promised to aid me in every way possible. He verified the probable usefulness of Mr. Jörgensen in the work, knew that he was somewhere across the mountains in the province of Tucuman and said he could find out from his friends, administrators of the sugar estate at Concepcion. He gave me some very useful information about the surrounding region and promised to send me a good peon to accompany me into the field. Early next morning Dr. Schmidt called on me at the hotel with a telegram from Concepcion stating that Mr. Jörgensen had left there on his way to Andalgala and that he expected to spend a fortnight collecting on his way across the mountains. The peon also showed up and said that he was ready to go to work.

The inhabitants of Andalgala seem prosperous and content. The cultivation of the grape and the making of wine are their chief occupations. The place also has some local reputation for the production of quince preserves, put up in brick form, somewhat resembling the well-known Cuban guava paste and jelly. The quince trees, of which I saw very few, I believe, are grown in moist valleys, high among the surrounding hills. The houses in the village are practically all constructed of adobe, the village in reality being a huge irrigated vineyard. It boasts of an electric-light system which goes out at midnight and a very primitive moving picture show every Sunday night. In the outskirts, on

small scattered irrigated patches, wheat is grown, the harvesting of which is very primitive. Grain in the straw is spread in a circle on the hard dry ground, a horse hitched to a central post is driven 'round and 'round over this straw until the grain is tramped out. After the straw is raked off, the mixed chaff and grain is thrown high into the air during a slight breeze, thus cleaning the grain. People who do not buy their flour obtain it by grinding this wheat in a bowl-shaped cavity in a hard wood log with a stone or wooden pestle. Occasionally one sees a stone mortar used.

As soon as my peon reported for duty the collection of cacti was begun by excursion afoot into the surrounding desert, composed largely of dry spiny shrubs and rocks. The nearby hills were also worked in the same manner and ascensions to the summit of the nearest mountains, the highest of which reaches an altitude of about 6,000 feet, were made, most of these cacti having a range over the plain, also occurring in lesser quantities to the highest elevations thus reached. The massive columnar *Cereus*, locally very abundant, known as "Cardon Grande," however, seldom reached that altitude, several others of the *Cereus* group occurring only on the higher sides of these mountains. Later long excursions across the plains and up various arroyos were made on horseback. A tour also was taken for a considerable distance down and along the dry stream bed of Rio Andalgala. Here a very pretty *Echinocactus* was found in very limited quantities on a small sand dune out of reach of the torrential overflow of the stream. This plant was seen nowhere else on my trip and showed nothing but small buds which with careful carrying however developed flowers about a month afterward, when a good photograph was obtained of it. Having packed the live plants and cuttings and all other material that required no further attention and shipped them to Buenos Aires, and having sent the rest of my outfit by rail around to Tucuman, I started on the morning of December 28 for Concepcion on the other side of the mountains on mule back accompanied by my faithful peon, carrying a single change of clothing and a meager collecting outfit, as I did not expect to find many new cacti. In

this, however, I was much mistaken, as eight species, apparently new to me, were seen along the trail. To do justice to these I should have allowed myself at least three days instead of the two usually occupied to make the trip, and should have taken along an extra pack animal. The route was a rough rocky trail through a canyon south of town and after proceeding for several hours I passed through a small area of a large columnar *Cereus* quite distinct from the one so common at Andalgala. The small area of this encountered here was the only one seen on the entire trip. As we reached higher elevation some water was found and a hut with a little patch of irrigated land was passed. We lunched at a spring not far from the summit and crossed the divide at an altitude of about 7,000 feet, descending into a high shallow valley, running in a north and southerly direction. Crossing it another range of a less rocky nature was crossed and descent was made into a long, more grassy canyon. After hours of riding in which one other species of cactus was seen, we entered a large valley running north and south. The stream, locally called Rio Grande, flowed in a northerly direction and contained more water than I had seen since I left the ocean. Frequent and quite extensive irrigated patches were to be seen as far as the eye could see to the south, while the view northward indicated more fertility. Just before night we reached the large house of the administrator of the Esquina Grande Estate. Here I was taken in and cordially provided with a good warm meal and a comfortable bed, my peon finding quarters for himself and the animals with the numerous employees of the establishment. Early next morning I busied myself looking after the collections of the previous day, which owing to fatigue and darkness I could not attend to the night before. After coffee and the well wishes of my host we proceeded on the long seventy-five-kilometer stretch that lay before me. Passing northward and down stream the vegetation was entirely different from anything I had as yet seen. A conspicuous plant was a tall red flowering *Lobelia*, reminding one very much of our own *Lobelia cardinalis*. The plants were practically all strangers to me and I was loath to pass by them without making a collection. A short cylindrical cactus was

seen sparingly in groups on accumulations of humus on the large bowlders in and along the stream which suddenly broke through a chasm of the range forming the eastern boundary of this valley. The road upon which we traveled had been a well-constructed one but now was in a bad condition, apparently after many years of neglect, as it had lost its importance after the construction of the railroad west of the mountains. It continued northerly up the valley along the stream which now flowed southward and finally by many windings and twistings reached the top of the range that had formed our eastern boundary. As we ascended, trees became more numerous and taller until they formed a real forest, the predominating element being a beech-like tree belonging to the genus *Alnus*. On reaching the top of the ridge, on which we traveled for some distance, an imposing view was afforded. To the left beyond the green hills close by a stretch of high brown snow-capped mountains was visible as far as the eye could see. To the right one looked down into a vast tree-covered flat which seemed to have no eastern limit. The road now descended quite rapidly and tortuously through rank vegetation. The elements of this were all strangers to me, one of the largest trees being an *Araucaria;* another interesting plant was a species of *Rubus* with arching stems twelve to fifteen feet long reaching out over the roadway. It had the appearance of our northern blackberry with the fruit of a black cap raspberry and was a novelty very much appreciated, it being the first South American fruit that I had encountered. It is, however, very much inferior to our own raspberry, having an insipid taste and a mulberry-like flavor. The people called it "murus." As we neared the base of the hill I saw the first specimens of *Rhipsalis*, but they were aggravatingly high and could not be collected. Having finally reached the plain, the road continued for many kilometers through dense forests of tall trees and cleared patches devoted to the cultivation of mace and pasture became more numerous when near Alpachiri. This place appeared to be the type station of *Rhipsalis Tucumanensis*. After a long and tiresome ride through increasing cultivation which, as we neared the town, consisted of sugar plantations, Concepcion was reached

just before dark. Next morning I went out to the sugar mill, and found a friend of Mr. Jörgensen. He said that he had not come back so I dismissed all hopes of his coöperation and mailed my letter for him to his home address and some weeks afterward received one from him expressing his regret and disappointment at our not having met and stating that I had passed close by his camp on my way across the mountains, his peon having seen me.

It being evident that this was no cactus country I took the next train for the city of Tucuman, where I arrived early in the evening and after a much needed bath, a fairly good meal and a good night's rest I felt quite fit next morning.

Although it was Sunday I had no difficulty in having my outfit, which was sent around by freight from Andalgala, brought to the hotel. In the afternoon, after overhauling the outfit, I took a stroll out into the country which was rather highly cultivated. When some distance out I noticed a tall patch of green which I reached after some difficult cross-country hiking. It proved to be as I had surmised, a tract of primeval forest, the trees of which harbored many *Rhipsalis*, of which two species were collected. Here I was overtaken by a torrential downpour of rain and received a most thorough soaking. The opposite side of the woodland faced the military barracks and a road to the city and I finally reached my hotel a sorry-looking, water-logged, mud-bespattered object. Monday, as my finances needed replenishing it was necessary for me to visit a bank. Here my wants were attended to and I learned that the scientific gentleman in Tucuman to whom Dr. Hicken had given me a letter would likely be found at the museum close by and that the curator, Mr. Schreiter, a German naturalist, would likely be called upon to act as my interpreter, as the gentleman in question was not familiar with the language best at my command. Mr. Schreiter was well posted about the surrounding country and expressed much interest in my work, telling me of a high arid region to the northwest where he had seen many cacti. His analogical and archaeological investigations require him to go in there quite frequently. The scientific gentleman to whom I had a letter was at this time at the university nearby, to which we

now started. At the university was Dr. Fidel Zelada, said to be the local authority on cacti, who had a collection of living plants at his home which he cordially invited me to see and I agreed to do this in the afternoon. The person for whom we had been looking not being at the university, I left with the understanding that I would meet Mr. Schreiter at the museum in the afternoon, when he told me that he had seen this person and that as I had already been told as much about the cactus region as he himself knew, it would be unnecessary for me to see him.

As it would be necessary, in order to get into the above mentioned cactus region, to organize a caravan and as several weeks' time would be required to accomplish anything, I felt that I had better not attempt it.

As it had been raining continually for several days with no immediate prospect of its stopping, I boarded the train the next morning for Salta, the capital of the province of the same name. Salta, which is situated in a moist, fertile, and highly cultivated valley, has very wide streets, most of them provided with well-kept shade trees. A masonry canal is constructed entirely around the city to protect it from inundation by the torrential flow of water when there are heavy rains in the nearby hills. Owing to an accident on the railroad due to the locomotive leaving the track, we were held up for something like six hours and did not get into Salta until two o'clock the following morning, an hour at which it is not pleasant to contemplate getting into a strange city in a foreign land. However, I found a sleepy coachman who agreed to take me to a hotel, to the proprietor of which, fortunately, I had a letter. The establishment was still open and full of activity and I fear I would have received little attention had it not been for this letter, upon reading which the proprietor became interested in me, telling me that his rooms were all occupied, but he kindly found quarters for me in a nearby hotel and the next day he fixed up a room, well back of the patio, for me. Although this was away from the flowers it had the advantage of also being away from the noise and turmoil incident to an all night restaurant and subsequently promised to be very convenient and comfortable quarters. Messrs. Haustein and Schaaf,

proprietors, their respective wives and sister, manifested the traditional Teutonic interest in cacti and aided me very much in my work. The gentlemen were constantly making inquiries among their patrons, calculating to aid in the work, thus securing many interviews and invitations from planters and others. Notable among these was Mr. E. H. F. Schultz who had formerly been connected with the United States Department of Agriculture, stationed at Florida and Panama and now director of the provincial nursery at Tucuman. Upon expressing my surprise that I had not heard of him at Tucuman he further astonished me with the fact that a well-managed experiment station whose staff was composed entirely of English-speaking persons was maintained there. He said that some time ago they had understood that a North American who was investigating the cacti was in Argentina and as they had expected him to come to Tucuman they had made preparations for him at the station but that the person never showed up. He exacted from me the promise that I could call on them on my return southward, when he felt sure they would be able to show me some cactus. Collections were made in the nearby hills and thickets, and excursions to various remote parts were taken. At one of these, San Lorenzo, a well-watered place in the western foothills, the novelty of seeing a short columnar cactus and a large scarlet-flowered begonia was experienced. One of the most prolific stations, however, was Mojotoro.

Having packed my live and other finished material and shipped it by freight to Buenos Aires I went to Calilegua in the province of Jujuy, a region highly recommended by Mr. Schultz, who gave me a letter of introduction to Mr. Robert Smythe, in charge of one of the Leach estates. At Calilegua I deposited my bag at a little red hotel, stating that I wanted a room and started out to find Mr. Smythe, whom I found without difficulty. After reading Mr. Schultz's letter he closed his desk, with the remark, "Come over to the house." The pathway to this led through a well-kept and most interesting nearly tropical garden. Mr. Smythe inquired, "Where is your bag?" When I told him it was down at the hotel and remonstrated that I did not wish

to throw myself upon his hospitality he remarked, "We cannot permit a white man to stop there. I will send for your baggage at once." After observing the British custom usually indulged in at this time of the afternoon, we engaged in a general conversation, in which I discerned that Mr. Smythe, who had resided in the republic for upwards of thirty years was a great lover of plants and flowers and was particularly well versed in tropical things and orchids. His observing mind enabled him to recall many places where he had seen cacti but he made no pretense at knowing what they were. He also told me that Dr. Spegazzini, a southern botanist who had described many species of cacti, had stopped there some years previous and that he was very much enthused over what he had secured in the dry hills some leagues distant up the Rio San Lorenzo. Although Calilegua is situated about 23½ degrees south latitude, owing to its elevation in the valley it is visited by occasional killing frosts, which last winter were so severe that the entire banana plantations were killed to the ground, destroying thousands of bunches of bananas and entailing a further loss of twelve months' production. Citrus fruits and sugar cane were, however, not seriously damaged. The coffee plantations several thousand feet up in the hills were completely destroyed and as this crop has not proven profitable, owing to the scarcity of labor, it has been abandoned. This Leach estate, comprising everything in sight, includes thousands of square miles of surrounding country. The fertile lands of the valley are devoted principally to the culture of sugar cane, which is sent to an adjoining estate of the same corporation, for grinding, and thousands of acres are successfully devoted to the culture of bananas. Recently the cultivation of citrus fruits has been undertaken and it is Mr. Smythe's chief concern and delight to further this culture, leaving the better understood crops to younger members of his staff. Here also one sees experimental plots of most all tropical fruits such as improved varieties of mango, alligator pear, etc. The rainfall, although ample for successful agricultural operations if properly distributed throughout the year, is precipitated in three or four consecutive months, thus leaving the remainder of the year with-

out rain, so it is necessary to resort to irrigation, an ample supply being furnished by the streams coming from the mountains. The next day being Sunday, which at this establishment, unlike many others, is devoted to rest and recreation, I necessarily busied myself unpacking and caring for my incompletely dried material. Collections were begun next morning, my host having seen to it that I was provided with a good guide and horses. We proceeded up the San Lorenzo valley through miles of cane and banana and thence into dense forests of tall trees and shrubbery which harbored various species of *Rhipsalis*, at least three of which were new to the collection. A flat broad three-ribbed variety most resembling a *Phyllocactus* was a very striking object. Festoons of it frequently five to six feet long with margins densely covered with rather large orange-colored fruit quite common. I was rather surprised too, to find a number of different kinds of the *Cereus* group on the forest floor, which one would have thought was too humid and fertile for this class of plants.

We had set out in the morning with the idea of collecting in the dry hills northward, which had so delighted Dr. Spegazzini, but the many things that arrested my attention had so impeded my progress that we made no attempt to get there in the afternoon. The day was very hot and sultry, but the last stage of our return trip was made through a heavy cold rain and violent hail storm. It being necessary to ford the river several times in order to reach the dry hills already mentioned, it was useless to attempt this next day, as the river was on a rampage and any attempt to cross it would have proved suicidal. My work was much retarded by the wet weather, but excursions were made into various places in all directions except the one bounded by the river. Mr. Smythe frequently accompanied me places where he had remembered seeing some kinds of cactus. His guidance and his direction to other special points enabled me to secure a number of species which otherwise could not have been obtained, as they were not met with elsewhere. An excursion into the mountains to the region of the frozen coffee plantation was very interesting, but no cacti were found save several *Rhipsalis* which had already been collected. Southward the valley becomes dryer and less

fertile, being quite open, with few scattered trees. At the time I was in there many of the trees were standing in several inches of water, their branches thickly covered by a close clinging *Rhipsalis*. Here the majority of the opuntias were also standing in water. By this time the water in the river had subsided very little but, being anxious to get into the hills where Dr. Spegazzini had collected, another attempt was made to reach them. I was advised, however, not to attempt a crossing contrary to my guide's advice as he was considered an expert in such matters, being credited with having saved the lives of several persons, among them, it was whispered, being Mr. Smythe. Three attempts to cross the river at different points proved futile and I returned to the house very much disappointed and prepared to move onward. It would be ungracious if I should fail to express to Mr. Smythe my sincere gratitude for his kindly and helpful interest, his hospitality and the many conveniences placed at my command.

Going around to Jujuy, capital of the similarly named province I found the place to be situated among bright green hills, apparently quite fertile. Towering over all, however, were the distant mountain peaks with their snow-capped summits. As this evidently was no good collecting ground for cacti I boarded the weekly train next morning for La Quiaca, the end of the government railroad and on the Bolivian border. This is a long and tiresome ride, one passing for miles among green hills until Leon with its extensive peach orchards is reached. Here our engine leaves us and a special one provided with a system of cogs takes a position on the back of the train and starts to push us up a very steep grade on a wretched railroad. Soon the green disappears absolutely and one finds himself surrounded with a high picturesque hill of several colors and it is evident that one has entered an entirely different region than the one left behind. The top of the ridge is reached at Volcan and one cannot help appreciating the name, the country appearing as though it had recently passed through a furnace. Again provided with an ordinary engine we continued northward, still up grade, but not so severe, through a panorama of various-colored fantastic hills

or mountains, finally reaching sort of a plateau at Tres Cruces, the highest elevation reached by any railway in Argentina. Some hours later, in this case nearly midnight of the second day out, our destination was reached, February 1.

La Quiaca, at an elevation of 3,442 meters, consists of buildings erected at the terminal of a railroad now being built to continue into Bolivia, the large viaduct crossing the stream separating the two republics having been completed at the time of my visit. Several stores, a meteorological station, a large sprawling hotel building and a scattered collection of small, low adobe huts complete the town, the streets of which are merely rocky and ill-defined roads. Villazön, the Bolivian town just across the border, is perhaps more important, having a large governmental building, more and larger stores, and, I am told, a much better hotel. The many native stores, in reality merely booths along the streets, have most of their stock in trade on exhibition on a shelf or two, most conspicuous of which articles are cocoa leaves, which the natives seem constantly to be chewing. At a latitude of less than 22 degrees south the high elevation makes it very cool, the temperature after sundown in summer being only about 40 degrees, and I am told that it is below freezing for nine months in the year. The ground is covered with small stones, totally devoid of tall vegetation. No shrub over eighteen inches high was observed anywhere, but at the time of my visit many small, deep-rooted plants were in flower, these representing a considerable number of families. To the east, as well as to the west, snow-capped mountains were in view at this time of the year, but I was told they had no snow on them during the winter as there was no precipitation and the summer snows were blown off. There is no cultivation except that here and there along a stream a little irrigated patch will be devoted to barley or potatoes, the tubers of which reach only a very small size. Goats and an occasional flock of sheep are seen and herds of llamas are met with. They are used for transportation and I believe are the principal source of the coarse woolen blankets used here.

Collections were made on the surrounding plateau and among

the rocks of several arroyos and I was very much surprised at the number of species that I encountered, as I had hardly expected any cacti would exist at this temperature or elevation. They are mostly low-growing forms, an exception being a columnar *Cereus* which I have seen to attain the height of five feet. At this time, the wet season, they were all very fleshy. The elliptic jointed opuntias which form semicircular masses sometimes reaching a considerable diameter were exceedingly so, their pulp being of such a syrupy consistency as to make this plant exceedingly difficult to preserve. In fact it was impossible to get some of these through satisfactorily. To do this, collections, I presume, must be made during the dry winter months, when I should think their pulp would be less supplied with moisture. Collection here proved very difficult; although the hotel man promised me a guide and horses several days in succession, they were never forthcoming, thus compelling me to work practically alone. The rarity of the atmosphere made it impossible for me to increase my pace more than a slow walk. Exercising more than ordinary exertion or carrying more than a trifling load was impossible.

In my own search for help I entered the office of a German commercial establishment where the kind clerk soon informed me that their cashier, Mr. Heinrich Schroder, was an expert in cacti and I lost no time in meeting him. He had for years owned an amateur collection, as many of his countrymen of the Fatherland did, and was well posted on Schumann and told me that he had detected at least twenty-five different kinds about La Quiaca, but he found it impracticable to maintain a collection. The next day being Sunday, the store closing at twelve o'clock, he volunteered to accompany me afield in the afternoon, an act which was highly appreciated, for he pointed out several species that I certainly would have overlooked. As I had met with such slow progress and was eager to get all I could out of this I remained afield until nearly dark of my last day's stay and it was not until two o'clock in the morning that I finished the necessary packing so as to be able to board the weekly train southward shortly after dawn. The trip to Tucuman required forty-eight hours of

constant riding, during which time, while still in the arid region, an accident to the locomotive necessitated our stopping in a very weird place on a narrow arroyo. This afforded an opportunity to collect one of the many forms seen along the railroad. In order to collect these species it would be necessary to organize a caravan or perhaps arrangements could be made with a railroad official for the use of a motor hand car.

Arriving at Tucuman on the morning of February 7, I immediately called upon Mr. Schreiter at the Museum to get directions which would take me to Mr. E. H. F. Schultz, director of the provincial nurseries. Heavy rains, however, prevented me from finding him until late in the afternoon. After giving me a hearty welcome, he made arrangements to go out to the experiment station, a considerable distance out of town. Accordingly early in the morning Mr. Schultz called for me in his automobile and I soon found myself being welcomed by Mr. W. E. Cross who at once placed at my disposal such facilities as the institution afforded for the furtherance of my work and had me called for each morning at the hotel and driven out to the station and provided for my return in the evening. I also met Mr. G. L. Fawcett, formerly of the United States Agricultural Department, stationed at Miami and later at Porto Rico, well known to many of my acquaintances; Mr. E. W. Rust, also a fellow citizen; Mr. Harris and several others. This institution is unique among similar establishments of its kind in the country, as it is officered by English-speaking gringoes and it is needless to say they are proud of it. The remainder of the day, in which it rained most of the time, was spent at the station discussing plans and arrangements to further the work. My new friends, although not pretending to have any knowledge of the cacti, would change my belief that there were no cacti near Tucuman. Arrangements were made for an excursion next morning into a less humid region. Continued rains made this prospect very dubious but to my great surprise Mr. Schultz with the rest of the party, equipped with collecting paraphernalia and food, drove up to the hotel early in the morning. When I expressed my doubts as to the advisability of starting out with the roads in such condition, they assured me

that the prospect of a fine day was certain and that the bad road could not extend much north of the city, as the downpour had been quite local, but as we reached the outskirts and entered the mire of the so-called Camino Nacional I was astounded at Mr. Schultz's perseverance. I have had some experience with automobiles on mud roads but I had never seen anything like this attempted. At many of the miry places the entire party except the driver would leave the car and pick their way across the bog hole, my host guiding the lightened machine nicely past. We all took turns in pushing the car through mud holes out of which its own mechanism was unable to extract itself and once we got on the top of a bump where we struck so fast that the combined energy of the party could not move it and it was necessary to get the assistance of a peon, a horse, a pick and a shovel. Fortunately we had now gotten through the wet section and entered a region of dry low woodland in which numerous and often very gigantic examples of Cardon Grande (*Cereus Pasacana*) were frequent, also several *Rhipsalis*, one of which seemed to make the giant cactus its host. Numerous dry gravelly and some other shaley hills in the woods harbored various smaller cacti while *Opuntia* grew in the forest along the roadside. We lunched on the porch of a country store and kept onward until approaching darkness warned us to turn around. Fortunately the bright sunny day had so dried up the boggy road that our return trip was quite uneventful. This excursion was remarkable, as nineteen distinct kinds of cactus were seen during the day, several new to my collection and I doubt if there is a similar incident on record. Just as we entered the experiment station the automobile refused to move any farther and we were obliged to push it to the house. Investigation showed that some vital part of the machinery which had held out all day had broken down at this most opportune moment. One excursion was made to Trancas, with Dr. F. Zelada and Mr. Rust into a low desert-like thicket where a number of species not before seen were secured and another to with Mr. Schultz and a servant to Choromoro, from which we walked southward to Vipos through rough dry lands covered with low woods and thickets. Here we were overtaken

by rain and walking was made very difficult. In order to reach Vipos, from where a train was to be had in the evening, it was necessary to cross a very low railroad trestle over a river which was at that time on a rampage. The ties were four feet or more apart so that it was necessary to jump from one to another, their wet and slippery condition making it a very precarious task, but we crossed it without a mishap, reaching the station in time to shake off a lot of mud and rearrange our water-logged spiney burdens. The unsatisfactory condition in which I had brought my specimens from the Bolivian border coupled with the wet weather here encountered, in spite of the facilities provided at the station, made the preservation of the specimens a time-consuming task and it was not until February 21 that I managed to have them packed and shipped to Buenos Aires and prepared to leave Tucuman. After a few hours' ride, on the morning of February 22, I arrived at Santiago del Estero, where I was fortunate enough to find a couple of peons who knew of a large *Cereus* which I had reason to believe grew there. It and several other species were found and a nice collection was made here. I left for Santa Fé, stopping for a portion of a day at Clodomira, where, among desert-like hills, I secured the flower of a *Cereus* which, though the plant had often been seen, was never found in flower. The province of Santa Fé happened to be the only province of Argentina not credited with some cacti on my list and I was able to place it where it belonged by finding two species of opuntias, one of which was new to the collection. Leaving the same evening, I arrived at Buenos Aires the following afternoon. Having arranged with an agent of the principal express and storage company of the Republic to bring my various shipments of material together in their storage house, I was very much disgusted to learn that owing to the total lack of system of this company my material was still scattered, no two consignments having been brought together. One shipment of seven cases was entirely unaccounted for and an anxious forty-eight hours were undergone before they were located, miles away at an outlying station. Examination and repacking revealed that very little loss had been sustained. A few of the oldest collections had dried up while some others had

decayed. After repacking and seeing to it myself that they were properly stored, I called upon Mr. Wallace of the steamship agency. He assured me that he would do all in his power to get proper transit of the material north when the time came for sailing.

I again left the city for the north, making my first stop at Concordia, Entre Rios, March 5, where I presented myself to Dr. Alazraqui, director of Estación Enologica Nacional de Concordia, whom I had previously met in a remote part of the republic and whose cordial invitation, at the time, to visit him here I had promised to accept. The Doctor was surprised to see me at this late date, as I had expected to come through this part of the country many weeks before, but he welcomed me most cordially and the kindly hospitality of the Doctor, his good wife and family, will long be remembered as one of the most pleasant incidents of my trip. Horses and men were placed at my disposal and in spite of the inclement weather I made a quite thorough examination of the region in a very short time. An excursion was made across the river into Uruguay and collections secured in the vicinity of Salto on March 7, in which was included the smallest cactus seen, probably the smallest growing cactus on the South American continent. Concordia, to my mind, is the prettiest place I have seen in Argentina and the only spot in which I would really care to live. The surrounding country is rolling, situated a considerable height above the Uruguay River. The terrain is barren to look upon, being composed of alternating areas of agate and other varieties of quartz, pebbles and lower stretches of deep black soil. The principal agricultural industries are the growing of citrus fruits, of which the mandarin is by far the leader, and the making of wine, for which the European grape in used exclusively. A favorite method of culture consisted of large groves of mandarine interplanted with grape. The institution presided over by my host is a national one devoted primarily to the wine industry, but various other subjects are being studied, among them citrus culture, the culture of essential oil-bearing plants and their distillation. Dr. Alazraqui is also the technical manager of a large bodago, as the wine factories are here called and on the second

day of my stay, which had been preceded with a twenty-four-hour downpour, so that I could do no collecting, I accompanied him to the factory, starting out in a modern touring car over roads which seemed like canals. The machine finally reached a depth of water that flooded and stopped the engine. When the frantic efforts of the chauffeur, who was in water up to his thighs, failed, he carried us out of the water on his back and we proceeded on afoot. That night we were taken home in a four-horse coach. My visit to the factory was of great interest, the exact and careful method with which everything is handled being a revelation to me. Great precaution is taken to avoid undesirable ferments, while the desirable ones receive every attention, and cleanliness is one of the principal means to secure these results. I left Concordia March 9 fully conscious that I could never fully express my gratitude to Dr. Alazraqui and his family for the kind and helpful hospitality shown me. From here I proceeded northward to Paso de los Libres, where a very short time was spent during which I crossed over into Brazil, but the low grassy region seemed to offer no inducement to one in quest of cacti, so I continued on my way northward, stopping for several days at Posadas in the territory of Misiones. Here I met Mr. Petzke, of the Esquela Agricultural College, who kindly accompanied me on an unsuccessful search for *Phyllocactus* credited to the region. From the beginning of my trip it had been my ambition to visit the great cataract of the Salto del Iquaqu falls, situated up the Uruguay River near the junction of the three republics, Argentina, Brazil and Uruguay, and pronounced by persons who have seen both to far exceed in grandeur and magnitude that of our own Niagara, but upon learning that it would require at least ten days and that twelve or thirteen would really be consumed before I could get back to Posadas this much-hoped-for holiday was necessarily abandoned, as my time was becoming very limited. I moved on into Paraguay. Asuncion, its capital, is a typical South American town similar to the larger cities of Argentina, with wide well-kept streets and comfortable-looking buildings. Its parks and public places, however, are in a deplorable condition, presumably due to the

unsettled affairs and revolutionary tendencies of the population. Here I met Dr. Karl Fiebrig, among whose many attainments is that of being well versed in the English language. The Doctor is director of the National Garden, a botanical and zoölogical institution, situated at Trinidad, where, by the way, our own Thomas Morong collected many years ago.

The Botanical Garden consists of a very large tract of land which had formerly been the site of a Government Agricultural School, from which many useful buildings were inherited. Many grand old trees of exotic species are an attractive feature. The zoölogical collection is probably the most developed. Many animals, chiefly of the South American fauna, offer an interesting study to one from the northern hemisphere. Their herbaceous plant collections, as everywhere in the tropics, are kept in slat houses, but these are of unique construction, unlike any I have seen elsewhere. Instead of the finished posts and supports commonly used they are built of native woods in the rough. The rustic posts and supports with their suspended and festooned plants of orchids, bromeliads, etc., the whole covered with as dense a growth of vines as the welfare of the plants would permit, gave one the impression of being in a tropical forest. A modification of this scheme adopted to our northern greenhouse construction would seem to me very desirable for houses used for orchids and similar plants. Another feature that particularly interested me was their collection of cacti. These were planted in the open on a high artificial mound, thus affording ample drainage during the wet season when these plants usually suffer if the excess moisture does not pass off promptly. The institution also has a considerable herbarium, principally of the local and South American flora and as they usually have an abundance of duplicates available for exchange, any one interested in increasing their collection of South American plants would do well to get in touch with the director. Dr. Fiebrig placed at my service a young man of German extraction who was well versed in Paraguay plants, having assisted in the collection of much of their herbarium material, so that I was able to secure a very representative collection of cacti in a short time. I also made several

excursions in various directions from Asuncion and went south to Paraguari, where the flat valley is dotted with hills rising about 1,000 feet above the surface, comprised of coarse conglomerate rocks, the sides of which harbor a number of kinds of cacti. All are very difficult of access. Other shaley hills supported another class of plants and different kinds of cacti.

After spending most of the night packing I started on what was really the beginning of my homeward trip by boarding the weekly train southward, where after about three days of none too pleasant riding I arrived at Buenos Aires with none too much time to get my things together and be ready to board the good ship *Verdi* for the voyage to New York. We stopped for a portion of a day at Rio de Janeiro, thus giving me an opportunity to again visit our good friend Dr. Löfgren, of the Botanical Garden, who had prepared a good collection of *Rhipsalis* to be presented to the New York Botanical Garden, which I brought with me. The remainder of the voyage was without incident, although we were passing through a very precarious time, which was made more impressive by the fact that we took on board at Rio de Janeiro eight or ten victims of German depredations in Brazilian waters, and New York was reached April 29. I am sorry to recount, however, that our good ship a few weeks afterward, while in European waters, was sent to the bottom by Kaiserism's ruthlessness.

Upon unpacking the collections at the Garden I found that the material intended for propagation and growing was in very good condition despite the fact that not only had it been necessary to undergo a voyage of twenty-one days in the baggage room of the steamer, but some of it had already been in storage about four months; it furnished prospects of many South American cacti probably never grown in North America.

Respectfully submitted,

J. A. SHAFER.

COURSES IN GARDENING IN COÖPERATION WITH THE INTERNATIONAL CHILDREN'S SCHOOL FARM LEAGUE

I. Simple Home Garden Courses for those Desiring to Conduct their Own Gardens

Mondays in March, 3 P. M.
Saturdays in April, 10:30 A. M.
Tuesdays in May, 3 P. M.
Tuesdays in June, 3 P. M.

The fee for each course will be five dollars, which will include necessary supplies and materials.

Talks

Soil and preparation.
Cultivation and weed control.
What and how to plant. Transplanting. Food values.
Relation of sunlight, air, and water to the garden

Garden Practice, and Observation

Planting, transplanting, thinning, spading, raking, hoeing, cultivating, weeding.
To be repeated, as needed, monthly, hours to be arranged.

II. Training Courses for Teachers for School Gardens

Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, April 1 to May 10, 1918, from 9:30 A. M. to 12:30 P. M. Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, May 6 to June 14, 1918, from 2:30 to 5:30 P. M. Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, July 9 to August 16, 1918, from 9:30 A. M. to 12:30 P. M.

This course will show the pedagogical value of the school garden, and how it may fit into the curriculum without disturbing it.

How, by proper planning, a teacher may take a full class into the garden and do effective work in the ordinary class period.

How the garden will furnish material of educational value, alive with interest, which will aid and inspire the regular classroom studies of reading, writing, arithmetic, language, drawing, geography, and history.

Instruction will be given, by lectures, practice work, and reading, in those subjects needed by teachers in school garden work, and connected classroom experiments.

Laboratory and garden tools will be supplied without charge.

The fee for each course will be twenty-five dollars, which will include necessary materials and supplies.

A certificate will be awarded by The New York Botanical Garden to students satisfactorily completing the course.

Lectures. 30 One-hour Periods.

Introduction: The school garden an educational laboratory, planned for the child's development. The teacher's attitude.

Correlation: Examples of how to use the garden problems in classroom work.

Planning the school garden: The ground plan and planting scheme.

Soil and fertility: Fertilizers and manures.

Seeds: Selection. Germinating. Planting. Transplanting. Thinning. Proper spacing.

Relation of water, air, sunlight to the garden.

Insects and animals of the garden.

Hygiene and physical culture lessons drawn from the garden work and study, to be applied by the teacher in guiding the child at work, and in talks in the classroom.

Studies of growing plants. Lessons in observation.

Short histories of several vegetables. Uses.

Elementary forestry and soil conservation

Garden Practice. 30 One-hour Periods

Spading, raking, hoeing, cultivating, planting, thinning, transplanting, weeding. Weed and insect studies. Harvesting and exhibit preparation. General and special observation.

Laboratory and Shop Practice. 30 Hours

Cultivating stick, garden line and knots, plot stake, marking board, hand carrier, root and insect cages, flat or window box, butterfly net, poison jar, spreading board, map, stencils, and studies and experiments with student-made apparatus.

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Vol. 7, part 1, 1906; part 2, 1907; part 3, 1912. Ustilaginaceae—Aecidiaceae (pars). (Part 1 no longer sold separately.)

Vol. 9 (now complete), parts 1 and 2, 1907; part 3, 1910; part 4, 1915; parts 5, 6, and 7, 1916. Polyporaceae—Agaricaceae (pars). (Parts 1 and 2 no longer sold separately.)

Vol. 10, part 1, 1914; parts 2 and 3, 1917. Agaricaceae (pars).

Vol. 15, parts 1 and 2, 1913. Sphagnaceae—Leucobryaceae.

Vol. 16, part 1, 1909. Ophioglossaceae—Cyatheaceae (pars).

Vol. 17, part 1, 1909; part 2, 1912; part 3, 1915. Typhaceae—Poaceae (pars).

Vol. 21, part 1, 1916; part 2, 1917; part 3, 1918. Chenopodiaceae—Allioniaceae.

Vol. 22, parts 1 and 2, 1905; parts 3 and 4, 1908; part 5, 1913. Podostemonaceae—Rosaceae (pars).

Vol. 25, part 1, 1907; part 2, 1910; part 3, 1911. Geraniaceae—Burseraceae.

Vol. 29, part 1, 1914. Clethraceae—Ericaceae.

Vol. 34, part 1, 1914; part 2, 1915; part 3, 1916. Carduaceae—Anthemideae.

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EDITOR

KENNETH ROWLAND BOYNTON

Head Gardener's Assistant

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FIRST GRANT FROM THE INCOME OF THE CHARLES BUDD ROBINSON FUND

Many friends of the Garden will recall the tragic death of Dr. Charles Budd Robinson, one of our first students and assistants, who was killed in 1913 by fanatic natives on the Island of Amboina, Dutch East Indies, while in the employment of the Bureau of Science of the Philippine Islands, when he was prosecuting comparative studies of the floras of the Philippine and the Dutch East Indian Islands.* In order to establish a permanent memorial of Dr. Robinson and his valuable contributions to science, a small fund to be held by the Garden was subscribed by a large number of his scientific associates, including many employees of the Philippine Bureau of Science, residents of the island Amboina, and by members of his family and personal friends, this fund amounting to about $650† on which interest of more than $60 has now accumulated. Recently, Dr. Robinson's sister, Miss Addie F. Robinson, has sent to the Garden a considerable collection of books which belonged to her brother, and has asked that these be sold and the proceeds added to the principal of the fund, which is held open for further enlargement. It was decided to utilize the income of this fund to aid botanical exploration, and it is fitting that the first grant from this income should be made for administration through the Bureau of Science at Manila.

* Journal N. Y. Bot. Gard. **15**: 16, 106.
† Journal N. Y. Bot. Gard. **16**: 127.

It so happened that additional knowledge of the flora and plant products of the island Guam is much needed at the present time by the Philippine Island scientists, and with our approbation, Mr. E. D. Merrill, Chief Botanist of the Bureau, has commissioned Mr. Peter Nelson, of the Guam Agricultural Experiment Station, to make as complete a collection as is possible of the plants of Guam, utilizing vacation time for this purpose, and applying a grant of $50 from the Charles Budd Robinson Fund to expenses for field assistance. Mr. Nelson will collect several sets of specimens, one of which will be incorporated in the museum collections at Manila, one set returned to the Guam Experiment Station, and the other sets sent to New York, one of these to be incorporated in our own museum collections and the others distributed to our correspondents. Representation of the plants of Guam in museums has hitherto been very scanty, and it is anticipated that much good will result from the expenditure of this small amount.

The data obtained by Dr. Robinson relative to the flora of Amboina and its relation to that of the Philippine Islands were, fortunately, in such good form as to be utilized by Mr. Merrill for use in an exceedingly valuable document, entitled, "An Interpretation of Rumphius's Herbarium Amboinense," published by the Philippine Bureau of Science, copies of which have recently reached us, and it is a great satisfaction to know that the scientific results of the expedition during which our lamented associate lost his life have been given to the world.

N. L. Britton.

INJURY TO EVERGREENS

Recent weather conditions have been the cause of considerable injury to certain evergreens at the Garden. These conditions, as found in the weather records of the Garden, are as follows:

From a temperature of −6° on February 5 there was a rise on the following day to about freezing, and a still further advance on the 7th, reaching 54° at about 3 P.M. It then dropped to

about 8° by the early morning of the 9th, rising a little later in the day to slightly above freezing, where it remained, with slight fluctuations, until the morning of the 12th, when a rather abrupt rise carried it to 42°, with a still greater rise the next day to 45°. During the afternoon of the 13th a drop occurred, the temperature going to 17° on the 14th, and again rising on the afternoon of the 15th to a maximum of 56° This rise was accompanied by a strong wind, while the previous high temperature, recorded on the 7th, was not so accompanied. Certain evergreens, which will be referred to below, presented no appearance of marked injury up to the 14th, passing through the previous warm period without noticeable damage.

At this season the soil is frozen, preventing of course all activity of the roots, and so making it impossible for the plant by this means to replenish loss which may occur through the leaves. At both warm periods the sudden and unusually high temperature (54° or 56° in the shade, but of course higher in the sun) would stimulate the leaves to activity, and loss that might occur through transpiration or evaporation must be supplied from the plant body, as the roots could secure none from the soil.

A strong wind under such conditions would add greatly to the difficulty, as evaporation is much greater then; and on the 15th there was such a wind, blowing continuously from the early morning until evening. It was not present on the 7th, and perhaps accounts for the sudden damage inflicted on the 15th.

The injury on many specimens was more marked on the south side, that exposed to the sun. This would suggest that it is not the wind alone which is responsible for injury, but that the unusual temperature is a contributing cause. The absence of damage on the 7th, in the absence of a strong wind, and the injury occurring on the 15th, would indicate that the wind had been the deciding factor in the ability of the plant to withstand the unusual conditions. The sudden appearance of the injury was marked, the affected plants appearing as usual up to this time.

Only certain evergreens were affected, and it is our purpose here to mention those only. The genus *Abies*, including the

firs, was particularly susceptible, a number of the species suffering. *Abies cilicica*: in the pinetum some of the specimens had the foliage burned, especially that on the south side. *Abies Nordmanniana*: in the pinetum most of the specimens were considerably burned, especially on the south side; in the group at the west end of the Long Bridge, a more sheltered position, less injury occurred; there was some damage also in the group at the Woodlawn Bridge. *Abies cephalonica*: a small specimen at the pinetum had the foliage badly burned or killed, while other larger specimens nearby suffered less; at the west end of the Long Bridge this species also received injury. *Abies numidica*: badly burned, the terminal portions of the leaves being killed. *Abies Momi*: specimens in the pinetum had the ends of the leaves badly injured. *Abies grandis*: specimens in the pinetum had the ends of the leaves injured.

Among the hemlocks, *Tsuga*, some of the dwarf forms of *Tsuga canadensis* had the foliage somewhat burned. *Tsuga Tsuga*: some specimens badly burned, while *Tsuga diversifolia*, also a Japanese species, is, as usual, without injury.

In *Thuja*, arbor vitae, *Thuja orientalis*, suffered severely in the pinetum, perhaps fatally in some instances, those at the Woodlawn Bridge, a more sheltered position, suffering less. *Thuja Standishii*, the Japanese arbor vitae: while none of those in the pinetum appear seriously hurt, they received more damage than is usual with this species, one of our best and hardiest conifers; the foliage on the sunny side of the specimens is of a golden brown, in strong contrast with the green of the opposite side.

Among the yews, *Taxus*, the forms of *Taxus cuspidata*, the Japanese yew, again strikingly indicated their better adaptability to this region, as compared with the forms of *Taxus baccata*, the foliage of which shows a tendency to burn, even in the sheltered location of the yew collection. The Japanese yew shows none or little evidence of injury.

GEORGE V. NASH.

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Buddleia Davidi. Addisonia **2**: 9, 10. *pl. 45.* 31 Mr 1917.

Xanthisma texanum. Addisonia **2**: 31. *pl. 56.* 30 Je 1917.

Cimicifuga simplex. Addisonia **2**: 35. *pl. 58.* 30 Je 1917.

Aster amethystinus. Addisonia **2**: 39. *pl. 60.* 30 Je 1917.

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HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN.

(*Continued*)

Calycanthus Mohrii. MOHR'S STRAWBERRY SHRUB.

Location: Fruticetum.

Natural distribution: Southern Tennessee and northern Alabama.

Calycanthus nanus. DWARF STRAWBERRY SHRUB.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Calycanthus occidentalis. WESTERN STRAWBERRY SHRUB.

Location: Fruticetum.

Natural distribution: California.

Meratia. ORIENTAL SWEET SHRUB

Meratia praecox (*Chimonanthus fragrans*). ORIENTAL SWEET SHRUB.

Location: Fruticetum.

Natural distribution: China and Japan.

ANONACEAE. Custard-apple Family

Asimina. PAPAW

Asimina triloba. NORTH AMERICAN PAPAW.

Location: Herbaceous Grounds.

Natural distribution: Eastern United States and Ontario.

LAURACEAE. Laurel Family

Sassafras. SASSAFRAS

Sassafras Sassafras. SASSAFRAS.

Location: Wild: common. Ridge west of Herbaceous Grounds. Along South Walk. North shore of west lake. North walk of Fruticetum.

Benzoin. SPICE-BUSH

Benzoin aestivale. SPICE-BUSH.

Location: Fruticetum. Wild: common in swampy or wet woods, and along streams and lakes.

HYDRANGEACEAE. Hydrangea Family

Philadelphus. SYRINGA

Philadelphus columbianus. COLUMBIAN SYRINGA.

Location: Fruticetum.

Natural distribution: Northwestern North America.

Philadelphus Conquete. CONQUETE SYRINGA.

Location: Fruticetum. West border, north of Mosholu Parkway entrance.

Hybrid.

Philadelphus coronarius. MOCK ORANGE.

Location: Fruticetum.

Natural distribution: Caucasus, Armenia, and southeastern Europe.

Philadelphus coronarius var. **foliis aureis.** GOLDEN-LEAVED MOCK ORANGE.

Location: Fruticetum.

Philadelphus coronarius var. **nanus.** DWARF MOCK ORANGE.

Location: Fruticetum.

Philadelphus Falconeri. FALCONER'S SYRINGA.
Location: Fruticetum.
Natural distribution: Japan.

Philadelphus gloriosus. GEORGIA SYRINGA.
Location: Fruticetum.
Natural distribution: Georgia and Alabama.

Philadelphus hirsutus. HAIRY SYRINGA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Philadelphus incanus. GRAY SYRINGA.
Location: Fruticetum.
Natural distribution: China.

Philadelphus inodorus. SCENTLESS SYRINGA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Philadelphus latifolius. PUBESCENT SYRINGA.
Location: Fruticetum.
Natural distribution: Tennessee and Alabama.

Philadelphus Lemoinei. LEMOINE'S SYRINGA.
Location: Fruticetum.
Hybrid.

Philadelphus Lemoinei var. **Albatre.** ALABASTER SYRINGA.
Location: Fruticetum.

Philadelphus Lemoinei var. **Avalanche.** AVALANCHE SYRINGA.
Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Philadelphus Lemoinei var. **Bannière.** BANNER SYRINGA.
Location: Fruticetum. West Border, with the above.

Philadelphus Lemoinei var. **Bouquet Blanc.** WHITE-BOUQUET SYRINGA.
Location: Fruticetum. West Border, with the above.

Philadelphus Lemoinei var. **Dame Blanche.** WHITE-LADY SYRINGA.
Location: Fruticetum. West Border, with the above.

Philadelphus Lemoinei var. **erectus.** LEMOINE'S ERECT SYRINGA.
Location: Fruticetum. West Border, with the above.

Philadelphus Lemoinei var. **Mer de Glace.** SEA-OF-ICE SYRINGA.

Location: Fruticetum.

Philadelphus Lemoinei var. **Norma.** NORMA SYRINGA.

Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Philadelphus Lemoinei var. **Virginal.** VIRGINAL SYRINGA.

Location: Fruticetum. West Border, with the above.

Philadelphus Nuée Blanche. WHITE-CLOUD SYRINGA.

Location: Fruticetum. West Border, with the above.

Hybrid.

Philadelphus Phantasia var. **Sirene.** SIREN SYRINGA.

Location: Fruticetum.

Hybrid.

Philadelphus Phantasia var. **Surprise.** SURPRISE SYRINGA.

Location: Fruticetum.

Philadelphus Rosace. ROSE SYRINGA.

Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Hybrid.

Philadelphus Satsumanus. JAPANESE SYRINGA.

Location: Fruticetum.

Natural distribution: China and Japan.

Philadelphus Satsumanus var. **nikkoensis.** NIKKO SYRINGA.

Location: Fruticetum.

Philadelphus sericanthus var. **Rehderianus.** REHDER'S SYRINGA.

Location: Fruticetum.

Natural distribution: China.

Philadelphus speciosus. SHOWY SYRINGA.

Location: Fruticetum.

Natural distribution: North Carolina and Georgia.

Philadelphus tomentosus. WOOLLY-LEAVED SYRINGA.

Location: Fruticetum.

Natural distribution: Himalayan Region.

Philadelphus verrucosus var. **pendulifolius.** DROOPING-LEAVED SYRINGA.

Location: Fruticetum.

Horticultural origin.

Philadelphus Voie Lactée. MILKY-WAY SYRINGA.

Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Hybrid.

Deutzia. DEUTZIA

Deutzia Candelabrum. CANDELABRUM DEUTZIA.

Location: Fruticetum. West Border, with the above.

Hybrid.

Deutzia Candelabrum var. **erecta.** ERECT CANDELABRUM DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia Candelabrum var. **fastuosa.** SUPERB CANDELABRUM DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia candida. WHITE-FLOWERED HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Hybrid.

CONFERENCE NOTES FOR JANUARY

The January conference of the scientific staff and registered students of the Garden was held in the laboratory of the museum building on the afternoon of January 2.

The program for this conference was as follows:

"The use of sphagnum for surgical purposes," by Mrs. E. G. Britton.

"The flora of northern South America," by Dr. N. L. Britton.

"Notes on some western lichens," by Mr. R. S. Williams.

Mrs. Britton stated that Professor John Bonsall Porter, member of the Executive Committee on Sphagnum Dressings of the Canadian Red Cross Society, had printed two pamphlets on "Sphagnum Surgical Dressings," in which he gives a brief history of the use of sphagnum in the present war and a discussion of the

methods of collecting, drying, and preparing it. She also exhibited samples of celluloid mounts made for the use of teachers and school children whose services have been enlisted in collecting peat mosses, and some photographs, taken by Professor Porter, showing the differences in the fibrous structure of sphagnum and absorbent cotton. Specimens of *S. papillosum*, *S. magellanicum*, and *S. palustre* were exhibited and the structure of their stems and leaves was discussed with reference to their great absorbing power. It was stated that the inferior and more brittle kinds are being used for pads and pillows. Local branches of the American Red Cross have been using Sphagnum, and various inquiries have been received regarding the natural supply. Collections of sphagnum for surgical purposes have been made at Worcester, Massachusetts, at Tom's River, New Jersey, and at Thomasville, Georgia.

In speaking on "The Flora of northern South America," Dr. Britton brought to the attention of the conference a matter which had been recently discussed by the Scientific Directors of the Garden after consultation with representatives of the Smithsonian Institution at Washington and the Department of Botany at Harvard University. This was the preparation of a flora of the northern part of South America, including Colombia, Venezuela, and the three Guianas. Taking the sedges as a typical family, he stated that of the 23 genera in this family, 191 species were known from Cuba, and 208 from northern South America; and he estimated that, since the South American region was much larger than Cuba and possessed a flora equally varied, it should yield twice as many species, making the probable total number of flowering plants in northern South America about 10,000. Serious work with the cryptogams was not contemplated in this discussion. Dr. Britton thought it would be desirable to keep two collectors in the field and one botanist at each of the three institutions working on the collections. There is already considerable available herbarium material from this region and Dr. Pennell, of the Garden staff, is at present in Colombia making a very large and important collection.

Mr. Williams reported on some corrections relating to a col-

lection of lichens from the Yukon region and also on some determinations of various rarely collected species from Montana. Nine additions are made to the list of 81 Yukon species as published by Dr. R. Heber Howe in the *Bulletin of the Torrey Botanical Club* in 1911, and one species in the list is not found represented in the original collection. Of the Montana species, 11 species were mentioned as having been rarely collected or even previously unknown. Publication of the paper in detail is planned.

A. B. STOUT,
Secretary of the Conference.

SPRING LECTURES 1918

Free public lectures will be delivered in the Lecture Hall of the Museum Building of the Garden, Bronx Park, Saturday afternoons, at four o'clock, as follows:

Apr. 6. "How to Prepare the Soil for Gardening," by Mr. J. G. Curtis.

Apr. 13. "Vacant Lot Gardens," by Mr. Carl Bannwart.

Apr. 20. "Tree-planting for Forests," by Prof. S. W. Allen.

Apr. 27. "Home Gardens," by Mr. Henry G. Parsons.

May 4. "Drug Plants and Their Cultivation," by Dr. H. H. Rusby.

May 11. "How to Grow Fruits in Limited Areas," by Prof. M. A. Blake.

(Exhibition of Flowers, May 11 and 12.)

May 18. "Fiber Plants and Their Cultivation," by Mr. Lyster H. Dewey.

May 25. "Women as Gardeners," by Miss Delia W. Marble.

June 1. "Diseases of Garden Crops and Their Control," by Dr. Mel. T. Cook.

June 8. "Insect Pests and Their Control," by Dr. F. J. Seaver.

The lectures, which occupy an hour, will be illustrated by lantern slides and otherwise. Doors closed at 4:00; late comers admitted at 4:15.

The Museum Building is reached by the Harlem Division of the New York Central and Hudson River Railroad to Botanical Garden station, by trolley cars to Bedford Park, or by the Third Avenue Elevated Railway to Botanical Garden, Bronx Park. Visitors coming by the Subway change to the Elevated Railway at 149th Street aud Third Avenue. Those coming by the New York, Westchester and Boston Railway change at 180th Street for crosstown trolley, transferring north at Third Avenue.

NOTES, NEWS AND COMMENT

The collection of flowering plants and ferns made in Colombia by Dr. Rusby and Dr. Pennell last summer and brought back by Dr. Rusby is being mounted and incorporated in the Garden herbarium.

The lichen herbarium of the late William Mitten presented to the Garden several years ago by his daughter Miss Flora Mitten is being incorporated in the general herbarium of the Garden. This collection contains many fine specimens most of which are determined.

Special effort should be made at this season of the year to aid in the campaign which is being waged against the tussock moth. The best means of checking this insect is to destroy the egg masses which were deposited in the autumn. These should be removed or prevented from hatching by daubing with creosote. Every egg mass destroyed now will mean several hundred less caterpillars to combat during the summer.

A very important and timely treatise on the control of diseases and insect enemies of the home vegetable garden, by W. A. Orton and F. H. Chittenden, has recently appeared as Farmer's Bulletin 856 of the U. S. Department of Agriculture. This bulletin consists of 72 pages and 82 figures and contains descriptions and methods of control of all the ordinary diseases and insect pests met with in the vegetable garden.

An article on the crown canker disease of roses, with several illustrations, by L. M. Massey, appeared in the December number of *Phytopathology*. This disease is caused by *Cylindrocladium scoparium*, which has hitherto been considered a saprophyte and not supposed to occur on roses. No method of control has been discovered, but rose-growers are cautioned to sterilize their soil and use only healthy stock.

A twig and leaf disease of *Kerria japonica*, due to *Coccomyces Kerriae* sp. nov., is described at some length by V. B. Stewart in the December number of *Phytopathology*. The disease not only causes a premature fall of the leaves but also affects the shoots, often injuring the bushes to such an extent that they die during the winter. A sulphur fungicide is recommended for checking the disease.

The water-color paintings representing designs of structures planned for the further development of the grounds by John R. Brinley and Louis F. Bird under the direction of the Endowment Committee of the Board of Managers were exhibited at Knoedler's Art Galleries, 556 558 Fifth Avenue, from February 2 to February 16, through the courtesy of M. Knoedler and Company. The exhibition was visited by several hundred persons, including many members of the Garden. The designs were explained to visitors by Mr. Bird and by members of the Garden staff, and printed descriptive catalogues were distributed.

Dr. Rydberg's " Flora of the Rocky Mountains and Adjacent Plains " was published by him on December 31, 1917. It is an octavo book of about 1100 pages, containing descriptions of 5897 species of plants included in 1038 genera. The area covered includes Colorado, Utah, Wyoming, Idaho, Montana, Saskatchewan, Alberta, and the adjacent parts of Nebraska, the Dakotas, and British Columbia. Most of the collections on which the work is based are preserved in the herbarium of the New York Botanical Garden. Dr. Rydberg has had the cooperation of many correspondents over a period of more than

twenty-five years, during which he has given special attention to the plants of the Rocky Mountain region.

Meteorology for January.—The total precipitation for the month was 3.86 inches of which 1.65 inches (16.5 inches snow measurement) fell as snow. Snow was on the ground continuously throughout the month. The maximum temperatures recorded for each week were 40° on the 6th, *49° on the 12th*, 39° on the 15th and 37° on the 25th. The minimum temperatures were *−5° on the 2d*, + 6° on the 13th, + 6° on the 21st, and + 8° on the 28th.

ACCESSIONS

MUSEUMS AND HERBARIUM

68 specimens of flowering plants from the Shasta National Forest, California. (By exchange with the United States Forest Service.)

31 specimens of lichens from Jamaica, West Indies. (Given by the Boston Society of Natural History.)

3 specimens of *Diopyros virginiana* from North Carolina. (Given by Professor W. C. Coker.)

365 specimens of flowering plants from Dutch Guiana. (By exchange with Harvard University.)

2,125 specimens of flowering plants and ferns from Colombia. (Collected by Dr. H. H. Rusby and Dr. F. W. Pennell.)

105 specimens of lichens from Yukon. (Given by Mr. R. S. Williams.)

2 specimens of Isoetes from Quebec. (By exchange with Brother Victorin.)

1 specimen of *Cycloporus Greenei* from Pennsylvania. (By exchange with Miss Eleanor Hodges.)

140 specimens at fungi from Porto Rico. (By exchange with Mr. J. A. Stevenson.)

16 specimens of fungi from New Jersey. (By exchange with Mr. C. A. Schwarze.)

1 specimen of *Hydnum pulcherrimum* from Louisiana. (By exchange with Prof. A. T. Bell.)

5 specimens of fungi from New York. (By exchange with Mr. Stewart H. Burnham.)

2 specimens of *Tricholoma* from North Carolina. (By exchange with Professor W. C. Coker.)

6 specimens of polypores from Oregon. (By exchange with Mr. C. E. Owens.)

3 specimens of fungi from Louisiana. (By exchange with Prof. A. T. Bell.)

10 specimens of fleshy and woody fungi from Washington. (By exchange with Miss M. McKenny.)

2 specimens of fungi from Colorado. (By exchange with Professor Ellsworth Bethel.)

15 specimens of fungi from Washington. (By exchange with Mr. J. M. Grant.)

4 specimens of fungi from New Jersey. (By exchange with Mr. C. A. Schwarze.)

200 specimens "North American Uredinales," Centuries 18 & 19. (Distributed by Mr. Elam Bartholomew.)

1 specimen of *Polystictus perennis* from Vancouver Island. (By exchange with Mr. J. Adams.)

1 specimen of *Sebacina spongiosa* from the Bahamas. (By exchange with Mr. L. J. K. Brace.)

13 specimens of fungi from Colombia. (Collected by Dr. H. H. Rusby and Dr. F. W. Pennell.)

1 cotype specimen of *Stemphylium Cucurbitacearum* from Plymouth, Indiana. (Given by Professor George A. Osner.)

PLANTS AND SEEDS

4 plants, all cacti, for conservatories. (By exchange with Dr. O. E. Jennings, Carnegie Museum.)

9 plants, all cacti, for conservatories. (Collected by Prof. J. F. Kemp.)

45 plants, all cacti from Florida. (Collected by Dr. J. K. Small.)

7 plants, Colombian orchids. (Collected by Dr. F. W. Pennell.)

1 plant, *Streptosolen Jamesonii*, for conservatories. (Given by Mr. J. H. Troy.)

1 plant, *Cyanotis* sp., for conservatories. (By exchange with Mr. H. Natho.)

2 packets of seeds. (Given by Miss E. M. Kittredge.)

1 packet of seeds, *Bomarea* sp., from Trinidad. (Collected by Mr. W. G. Freeman.)

3 packets of seeds. (Purchased.)

1 packet of seeds. (By exchange with Wm. Tricker.)

1 packet of linen seeds from Brazil. (Given by Treasury Dep't, Port of N. Y.)

4 packets of seeds. (By exchange with Department of Agriculture, Jamaica.)

1 packet of seeds of *Betula ditis*. (Given by Mr. W. W. Ashe.)

2 packets of seeds. (By exchange with the Bureau of Plant Industry, U. S. Department of Agriculture.)

56 packets of seeds of Colombian plants. (Collected by Dr. H. H. Rusby and Dr. F. W. Pennell.)

26 packets of seeds of Colombian plants. (Collected by Dr. F. W. Pennell.)

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EDITOR

KENNETH ROWLAND BOYNTON

Head Gardener's Assistant

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DR. P. A. RYDBERG, *Curator* (Flowering Plants)
DR. MARSHALL A. HOWE, *Curator* (Flowerless Plants)
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GEORGE V. NASH, *Head Gardener*
DR. A. B. STOUT, *Director of the Laboratories*
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ELIZABETH G. BRITTON, *Honorary Curator of Mosses*
DR. ARTHUR HOLLICK, *Honorary Curator of Fossil Plants*
DR. WILLIAM J. GIES, *Consulting Chemist*
COL. F. A. SCHILLING, *Museum Custodian*
JOHN R. BRINLEY, *Landscape Engineer*
WALTER S. GROESBECK, *Clerk and Accountant*
ARTHUR J. CORBETT, *Superintendent of Buildings and Grounds*
HENRY G. PARSONS, *Supervisor of Gardening Instruction*

Gadsden County, Florida. Plants of needle-palm (*Raphidophyllum Hystrix*) in foreground. Hammock in background, live oak (*Quercus Michauxii*) which tree predominates in the hammock.

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A WINTER COLLECTING TRIP IN FLORIDA

WITH PLATES 210 AND 211

During the second week of last December, I set out for South Carolina and Florida on a short excursion primarily for the purpose of studying and collecting cacti, persimmons, palms, and zamias.

My objective in South Carolina was Charleston, where I had hoped to find, for the first time, the fruits of the crow-foot prickly-pear (*Opuntia Drummondii*) and also to gather a supply of all the different kinds of prickly-pears growing naturally in that region, for planting in a cactus garden in southern Florida; as, being liable to flower and fruit freely there, the differentiating characters of the several species could be satisfactorily studied and compared. The specimens brought from Charleston to the Garden in 1916, and necessarily grown under glass, had thus far failed to produce flowers.

Unfortunately, an easterly gale accompanied by heavy rain kept me indoors during the time I had to devote to Charleston. Nevertheless, through the interest of Professor Paul M. Rea, director of the Charleston Museum, we later secured specimens of several of the species desired.

From Charleston I made my way to Jacksonville, Florida, in spite of a much disorganized railroad schedule, reaching my destination almost simultaneously with the arrival of a cold wave. Cold weather and rain accompanied me throughout nearly a week's field-work and collecting in northern Florida, but neither

[JOURNAL for March, 1918 (19): 47 68 was issued April 1, 1918.]

was the cold so uncomfortable nor the rain so steady that I was prevented from carrying out most of my plans, except in regard to photography.

The day following my arrival at Jacksonville was occupied by traveling to middle Florida. Among the rolling hills east of the Apalachicola River is the settlement of River Junction. At this point there is a wide river-swamp which is clothed with much interesting woody vegetation. There I found one of the palms I sought, the blue-stem (*Sabal glabra*), a relative of the cabbage-tree, but with a horizontal underground stem, instead of an erect trunk. However, the most interesting plant of that neighborhood is the eastern Torreya (*Tumion taxifolium*), a beautiful coniferous tree which enjoys locally the euphonious name of "stinking-cedar." I had hoped to be able to find the fruits of this tree for planting; but squirrels and perhaps other animals had evidently eaten them. However, several dozen seedling plants, a year or two old, were found and carried to southern Florida for growing. The stinking-cedar is one of our rarer trees. It grows only in a few colonies along the eastern bluffs of the Apalachicola River from River Junction to Alum Bluff about fifteen miles below, and it also occurs on the tributary stream Aspalaga Creek. It has related species in California, Japan, and eastern China; several fossil forms are also known.

In the woods on the hills near the river several kinds of evergreen ferns occur. The more interesting and conspicuous among them are the northern Christmas-fern (*Polystichum acrostichoides*) and a tropical spleenwort (*Asplenium heterochroum*). That region represents the southern limit of the geographic distribution of the former fern and the northern limit of that of the latter. Several kinds of pines and a variety of broad-leaved shrubs and trees comprise the woody vegetation of the hills and valleys.

An evening was devoted to going to Apalachicola, where it was hoped the fruits of the same kind of little prickly-pear I had been prevented from hunting for at Charleston might be found. The following morning I set out to investigate the stations where I collected the plant in question in the spring of 1916. The

belief, not to say superstition, once prevalent among the natives about Charleston,* to the effect that this plant was never seen in flower, does not obtain at Apalachicola, for many testimonies to the contrary were obtained from school children and from adults in the streets of Apalachicola, and I found numerous plants copiously fruited in and about the town. Many individual small clumps of intricate joints bore more than a hundred berries. The exceedingly loosely articulated structure of this cactus was referred to in former papers.† The fruits are even less firmly attached to the joints than the joints are to each other. The berries fall off at maturity or apparently often before, and are held in the matted mass of joints, instead of remaining firmly attached to the joints until long after maturity, as they do in most kinds of prickly pears. Since printing my paper "Cactus Hunting on the Coast of South Carolina,‡" Dr. R. M. Harper has told me of an observation he made on one of the sea-islands of North Carolina, where a number of joints of this very small but viciously armed prickly-pear had become firmly attached to the lips of a cow while it was grazing.

The berries that have fallen into a nest of joints defy one to extract them through the entanglement of slender but firm spines, at least with the fingers. A long sharpened stick or a long knife-blade is necessary for picking them out. The fruits are quite different from those of the other prickly-pears of the eastern United States. As was to be expected, they are smaller; they are mostly turbinate-ovoid, about an inch long, few-seeded, and of a rich purple color. The apex is pentagonal-umbilicate, and somewhat depressed at the center. The pulp is sweetish and devoid of acid to the taste, and quite mucilaginous.

I spent the day collecting in the pine woods west of the town and incidentally visited the grave§ and old home of the

* Journal of the New York Botanical Garden 18: 244. 1917.

† Journal of the New York Botanical Garden 18: 244. 1917, and 19: 3. 1918.

‡ Journal of the New York Botanical Garden 18: 237–246. 1917.

§ On Dr. Chapman's grave and in several front yards in Apalachicola are luxuriant plants of the Florida arrowroot (*Zamia floridana*). These plants are said to have been propagated from specimens brought to Apalachicola many years ago from southern Florida by Dr. Chapman.

late Dr. A. W. Chapman. Quite unexpectedly I met some of Dr. Chapman's former close associates who related numerous interesting incidents of that veteran botanist's later years. In addition, I also visited the house where Dr. John Gorrie, in 1850, invented the process for making artificial ice. I was told that the site of this house was once noted for the great quantities of the crow-foot prickly-pear it supported. Being situated near the boat-landing, it may have been the spot where Mr. Drummond discovered the plant when he visited Apalachicola in 1835.* Many years ago the yard of this house was graded with ships-ballast brought from Argentina, and some of the plants introduced with the ballast are said to persist there. A study of these, if carried on in the proper season of the year, would doubtless prove interesting.

Having used up the time my schedule permitted for Apalachicola, I started eastward for a short investigation of the hilly regions in Gadsden and Leon Counties. Tallahassee, the state capital, as well as a county seat, is located in an interesting part of the state, a region that seems altogether out of keeping with the topography one is accustomed to associate with Florida. The rolling hills, which reach an altitude of two hundred and sixty feet, the accompanying valleys, and the roads running through deep cuts in the clay and sand, remind one more of the hilly parts westward of the coastal plain in the more northern Atlantic states than of Florida.

My object in visiting the region, aside from observing the general features of the country, was to collect and photograph the needle-palm (*Rhapidophyllum Hystrix*) and to study the native persimmon (*Diospyros virginiana*). Dr. E. H. Sellards, State Geologist, and his associate, Mr. Herman Gunter, kindly devoted a day to field-work with me, and we had the company of the local botanist of Tallahassee, Professor Jerome McNeill.

The persimmon trees in that region were in full fruit, and they proved to represent the same kind as that of the lower portions of the Atlantic States, which grows naturally as far north as the New Haven lighthouse in Connecticut. The fruits and seeds

* Journal of the New York Botanical Garden 19: 1–6, 1918.

are almost identical with those from trees growing wild in the vicinity of The New York Botanical Garden. Tallahassee represents the most southern station for this form of the persimmon now known to the writer.

In order to find the needle-palm we had to go westward about twelve miles to the swamp of Little River.* On the way we crossed the Ocklocknee River and its swamp, but not a plant of the needle-palm was observed, although the river-bottom seemed to be an ideal place for it to grow. It may be interesting to note here that there is a striking difference in the erosion on the eastern and the western sides of the rivers and creeks in this part of northern Florida. The geological formation of the land is such that the erosion of the sand and clay results in steep, often abrupt, banks on the eastern side and in gently sloping banks on the western side.

After descending the steep hills of the eastern bank of Little River we suddenly came upon a most beautiful expanse clothed with the needle-palm. It grows over large areas, but thrives best in the dark hammocks where the cow-oak (*Quercus Michauxii*) reaches a wonderful development. Some plants of the palm are almost stemless, while others have stout, erect trunks at least five feet tall. This curious plant has its closest relatives in some palms of eastern Asia; among North American palms it has no close relatives. It is unique in its armament. This consists of myriads of elongate, slender, rigid needles, mostly 10–18 inches long, which project from the leaf-sheaths, into which they are woven near their bases. The needle-palm is one of our rarer kinds of palm, and, unlike all of our fifteen native species except the blue-stem, it occurs in a few localities in Georgia and in Alabama further inland than the limits of the coastal plain. In association with the needle-palm, but in limited quantities, was the blue-stem (*Sabal glabra*), our most widely distributed, although not our commonest palm. A cold rain set in early in the forenoon and interfered somewhat with our plans. Having accomplished all that was possible under the circumstances, we retraced our course towards Tallahassee. The lowering tem-

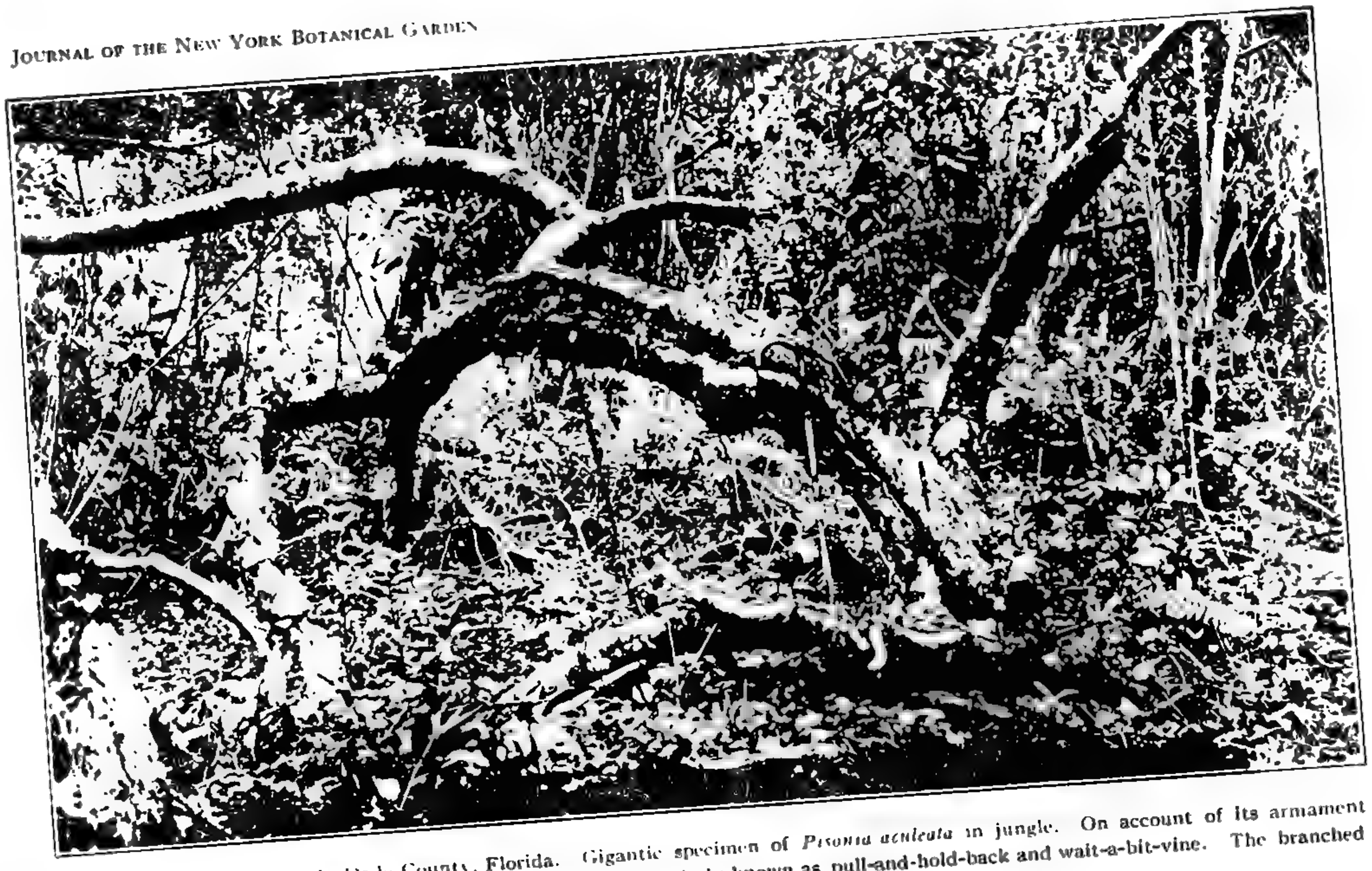
* Not to be confused with Little River of southern Florida.

perature forced us to temporarily seek the hospitality of a turpentine still to get warm and dry our clothes. Along the way we reluctantly passed by many interesting and tempting plants, particularly hepatics, mosses, lycopods, and ferns. Leaving Tallahassee on the eastbound afternoon train, by means of several varieties of railroad transportation, I reached Gainesville late in the night.

The following morning I was met by Professor P. H. Rolfs, Director of the State Experiment Station, and in company with Major Bayard F. Floyd, professor in the University of Florida, we set out in quest of a species of *Zamia* which had been reported from the vicinity of Gainesville and neighboring towns. There *Zamia* occurs farther north than we should expect to find it and well outside of the geographic range usually attributed to the two well-known species in Florida. Professor Rolfs located a colony in the high pineland about twelve miles west of Gainesville and we at once set to work to collect a supply of plants to be grown in the university grounds at Gainesville, and in the Miami region, both for ornament and for a careful comparison of this plant with that of southern Florida. The specimens I shipped to the Garden for the conservatory collection reached the north during the cold spell of the early part of January, and were killed by freezing.

Cacti had not been in evidence since I left Apalachicola; but at Gainesville the genus *Opuntia* reappeared in the form of an interesting plant which grows with the joints not only horizontally prostrate on the sand, but often conspicuously appressed to it, and bears red-purple, clavate fruits. Nothing like it has previously been found in Florida, and it may prove new to science.

At Gainesville I continued my studies of the persimmon through the discovery of three fruits remaining on a tree and a number of seeds on the ground around the base of the tree where they had been overlooked or rejected by the razor-back hogs, which are said to be very fond of the fruit. In this connection a letter from Dr. J. Arthur Harris, who happened to be in the Okeechobee region about that time and whom I had requested to collect persimmons for me, says: "I could not find persimmon



Royal Palm Hammock, Dade County, Florida. Gigantic specimen of *Pisonia aculeata* in jungle. On account of its armament which in effectiveness surpasses barbed wire, this plant is popularly known as pull-and-hold-back and wait-a-bit-vine. The branched [illegible] as devil's-claws.

fruits. Everybody assured me that it was too late. One boy said August was the month, others said that they were gone a month ago. The trees were practically bare. I did get a few dried leaves, and succeeded in finding a number of seeds; though the hogs seem to be the best specialists on this species."

I have been interested in the native persimmon of southern Florida for fifteen years, but during this period was unable to secure the fruits from that region. Last November, Mr. C. A. Mosier, Custodian of Royal Palm State Park, collected some fruits near Little River, Dade County, and kindly sent them to me. These were so different from those of our northern tree that I decided to investigate the problem thus brought prominently to my attention. The specimens from Gainesville, the Okeechobee region, and Little River all agree among themselves and differ from those representing the trees growing from northern Florida northward. The persimmon occurs southward almost to the Cape Sable region,* where it often grows as a shrub, sometimes only knee-high, instead of as a tree.

The late afternoon was devoted to an excursion to the famous Alachua Prairie, or Alachua Lake, which is situated several miles south of Gainesville. This prairie was visited by William Bartram, of Philadelphia, in the latter part of the eighteenth century and was first described by him in his "Travels" published in 1791. In the evening, I started by way of Palatka for Miami, where I arrived about noon the following day. The limited time I had at Miami was devoted to visiting several localities in continuation of studies of a number of different plants that I have had under observation for some years. The facilities for field-work were generously provided for by Mr. Charles Deering.

Two main points of interest were given special attention during the few days at my disposal. In Royal Palm Hammock I traversed the part of the jungle I had not been in since my first visit to that island more than ten years ago. At that time one

* A letter from Mr. Mosier, dated March 5, states that he had just found a persimmon tree in Royal Palm Hammock, with a trunk measuring ten inches in diameter.

had to cut out a trail as he went along; today one may walk through the densest jungle for a distance of several miles on trails carefully laid out and opened by the custodian of the park Along these trails many unique plant objects may be seen, while groups of giant royal-palms and the hanging gardens of epiphytic ferns, bromeliads, and orchids on the large live-oaks may be viewed through vistas in the jungle. Rare plants are being discovered in the forest as the trails are extended. Among the more remarkable objects recently brought to light is a gigantic specimen of *Pisonia* which is shown on an accompanying plate.

The most important locality investigated is a hammock crowning a high sand-dune situated along St. Lucie Sound a few miles south of Ft. Pierce. This hammock was noticed during a hurried trip through that region in the spring of last year. It is peculiar on account of the mixed association of temperate and tropical trees. In passing, it may be worth while to record that the third week in December, when we visited the above-mentioned hammock, was remarkable for its extraordinary fogs. This phenomenon is rare in that region; these were the first fogs I had observed there.

In going north from Miami to Ft. Pierce, during the earlier hours of the day we ran through areas of dense fog and passed through tongues or islands of cooler and warmer air which seemed to extend out from the Everglades. These areas of decidedly varying temperatures may account for the well-marked difference in the intensity of frosts in southern Florida or explain the occurrence or absence of frost, which is so often observed in adjacent regions. As soon as we passed out of the region of fogs, we ran into heavy showers, and rain accompanied us until late into the night.

Notwithstanding the rain, we carried on our cactus hunt, for which purpose we had visited the hammock, and gathered, in addition to several very interesting plants of other relationships, specimens of a gigantic kind of *Harrisia*, which is identical with *Harrisia eriophora* of the West Indies, or a species related to it, an undescribed prickly-pear, representing the semaphore opuntias, a group not previously found in the United States; and a

species of *Selinicereus* representing a genus new to the United States. In addition to these, a leafy cactus, *Pereskia*, a native of tropical America, popularly known as lemon-vine or West-Indian gooseberry, was found naturalized and growing plentifully in the hammocks along the shore of St. Lucie Sound. One of our very rare native herbaceous plants, *Peperomia loptostachya*, a relative of the black-pepper, was found in great abundance and in full flower. The trees of the sand-pine, the conifer that clothes most of the inland sand-dunes, or "scrub," was in full bloom, and the numerous clusters of bright yellow staminate aments were very conspicuous among the clusters of dark green leaves.

The hammock just referred to is rapidly disappearing, both by the axe and by fire, and I am looking forward with more than usual interest to a thorough exploration, under favorable conditions, of the remnant in which we found the several additions to our flora already mentioned.

Anticipating that the boxes of plants shipped north by express would be frozen during transportation, I brought with me a case packed with living plants of the rare and new cacti, and these are now growing in the conservatories of the Garden.

JOHN K. SMALL.

THE HERBACEOUS GROUNDS

The plantations collectively forming the area known as the Herbaceous Grounds, in the beautiful long narrow valley east of the great greenhouses and south of the museum building, were among the first established in the development of the Garden, some of them dating from 1897.

The collection in the southern part of the valley, illustrating plant families (systematic), was earliest installed, followed in 1903 by the planting of plots illustrating form and structure of plants (morphologic), located across the driveway north of the systematic plantation, and in 1906 by the establishment of plots containing plants directly useful to man by their products (economic), in the northern part of the valley. All three series

of illustrative plantations have since been maintained, suitably labeled, and they are of high educational value. The individual plots have been modified in detail from year to year, by the incorporation of additional species of plants, grown from seed at the nurseries, or collected from wild sources, or otherwise obtained; new plots have been added from time to time; and various kinds of plants have been lost by dying out under climatal or soil conditions. Perennial species are selected for the most part for these plantations, but annuals are grown, especially among the economic series. Recently, as a general rule, plants have been held for a season's observation at the nurseries before planting in the Herbaceous Grounds. About 3,100 kinds of plants were to be seen in these several plantations during the season of 1917, about the same number of kinds as in the past eight seasons.

All three series of herbaceous plantations are susceptible of enlargement in the number of species grown; this could readily be doubled in the space available by introducing more hardy perennials and by growing many more kinds of annuals, selected from those grown in the flower-gardens about Conservatory Range 1, and elsewhere, with additions.

The establishment of many new plantations during the past few years in various parts of the grounds, and especially the supervision and labeling of those installed on parts of the tract of about 140 acres added by the city to the Garden's reservation in 1915, including the Rose Garden, Horticultural Gardens and Iris Garden, requires so much of the time of Mr. Nash, Head Gardener, and of his assistant, Mr. Boynton, as to leave little available for attention to the Herbaceous Grounds; it was therefore determined some months ago, after authorization by the Board of Managers, to place this area and its collections in charge of an additional botanist-gardener.

As good fortune would have it, we learned soon afterward that we might secure for this post the services of Dr. Edmund Bronk Southwick, an enthusiastic naturalist, for many years occupied in Central Park as City Entomologist, and since his retirement from that position a few years ago, in charge of the Shakespeare

Garden maintained there by private effort. Dr. Southwick entered on his work with us at the middle of March as Custodian of the Herbaceous Grounds; he has office and workroom accommodations at the mansion, land and cold-frames at the nurseries; his park entomological experience will also be of value here, especially as we are anticipating a fight with the tussock-moth.

As a lineal descendant of Jonas Bronk, it is altogether fitting that Dr. Southwick should prosecute educational and scientific work in Bronx Park.

N. L. BRITTON

LOCATION OF FOUR PICNIC GROUNDS

CITY OF NEW YORK
BOARD OF ESTIMATE AND APPORTIONMENT

Office of the Secretary
Municipal Building

December 28, 1917

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF,
New York Botanical Garden,
Bronx Park, Borough of The Bronx:

Sir: Transmitted herewith is certified copy of a resolution adopted by the Board of Estimate and Apportionment on December 21, 1917, approving the picnic grounds set aside by the Board of Managers of the New York Botanical Garden, as described in a communication addressed to the President of the Borough of The Bronx by the Director-in-Chief of the New York Botanical Garden on December 14, 1917, and shown on a sketch accompanying said communication.

The resolution directs that the papers and sketch referred to be filed with the Secretary of the Board of Estimate and Apportionment.

Respectfully
(Signed) JAMES MATTHEWS,
Assistant Secretary.

MR. JAMES MATTHEWS, ASSISTANT SECRETARY,
Board of Estimate and Apportionment,
Municipal Building, New York City:

Dear Sir· I acknowledge receipt of your letter of December 28, together with a certified copy of the resolution adopted by the Board of Estimate and Apportionment on December 21, 1917, approving the picnic grounds set aside by the Board of Managers of the New York Botanical Garden.

Yours respectfully
(Signed) N. L. BRITTON,
Director-in-Chief

(Cal. 132.)

WHEREAS the Board of Estimate and Apportionment, at a meeting held on January 29, 1915, adopted a resolution setting apart an additional section of Bronx Park for the New York Botanical Garden subject to the condition that provision satisfactory to the Board should be made for the accommodation of picnic parties at suitable places, the aggregate area required for this purpose not to exceed ten acres, and

WHEREAS the President of the Borough of The Bronx has transmitted to the Board a communication addressed to him by the Director-in-Chief of the New York Botanical Garden describing four areas set apart for use as picnic grounds and shown on a diagram attached to said letter, from which communication it appears that these areas have been used during the summer of 1917 in order to test their suitability and have been found satisfactory and well adapted to the purpose.

Therefore, be it resolved that the four picnic grounds set aside by the Board of Managers of the New York Botanical Garden as described in a communication addressed to the President of the Borough of The Bronx by the Director-in-Chief of the New York Botanical Garden on December 14 and shown on a sketch accompanying such communication, both of which were transmitted to the Board of Estimate and Apportionment by the President of the Borough of The Bronx, be and the same hereby are approved as satisfactory.

Resolved that the communications and sketch above referred to be filed with the Secretary of the Board of Estimate and Appor nent.

I hereby certify that the foregoing is a true copy of resolution adopted by the Board of Estimate and Apportionment at a meeting of said Board held on December 21, 1917.

(Signed) JAMES MATTHEWS,
Assistant Secretary

THE HOME VEGETABLE GARDEN

One of the strongest national appeals this year for the home food garden is to save transportation space. Cargo for all carriers is far in excess of the means to move it, and war material has the first call. Whatever each of us can do to relieve the situation is a real help. Such green food as we can produce for ourselves is apt to be bulky, and with many home gardens the aggregate will be large, and will mean a tremendous total saving of carrier space.

More than ever we must use good judgment in our gardens, and never was there more inspiration to do our best. Seeds, fertilizer, and labor are scarce. Let us show our patriotism by using these to the best advantage. Let us have the best gardens we can, with the least waste of any of these precious items. Buy the best grade of seeds, and only as much as needed. Plant these seeds carefully, with special attention to spacing in the rows and between the rows, so that there will be less thinning this year than usual. Let us plant, or transplant, this year into gardens that have the soil better prepared than ever before, deeply dug, free from weeds, well cultivated. Let us be proud of the clean, straight rows, well spaced. Let novices grow what is reasonably sure of success, and leave to the experienced growers the special, the difficult, and the field crops.

The green foods are especially valuable in the dietary, and the fresher they are the more valuable they are. Only from the home garden can they be gathered just at the right stage of development and a few minutes before using.

The war is rapidly teaching us to measure many things by their service value rather than by the dollar value. The dollar value in times like this is uncertain. Plan your food gardens and measure their results in rations. Have you four in your family? Estimate the quantity desired per meal for four, the number of times the vegetable may be served, and plant to grow that amount. Most of the garden vegetables may be canned profitably at home, and only when young, *and fresh*, are they at their best for canning. The more of these vegetables that are canned for family use this year, the longer they can be substituted for the foods we are urged to save.

Wheat, sugar, fat, and beef are urgently needed "over there." The United States government sends this appeal directly to each family in America, to cut the use of these supplies on this side, that there may be plenty to send abroad. The world is watching America in full confidence that out of our abundance we will give freely. Every vegetable garden is a distinct aid in this patriotic service, supplying a variety of foods that cannot be shipped, which we can substitute for the foods they must have.

Measure your garden service to the country, by the number of meals the garden saves in

Wheat
Sugar
Fats
Beef

—and make it save them.

HENRY G. PARSONS

TREE-PLANTING FOR FORESTS

Simply because forests form one of the most important of the renewable type of natural resources, the matter of creating forests or re-creating forests on new areas or of reproducing them where they now occur is a serious and timely economic problem. War taxes make it more than ever necessary that there shall be no idle acres, and this applies to non-agricultural land too.

Nature has a way of doing things with a rather wasteful hand and her method of forest reproduction by scattering enormous quantities of seed from parent trees, is a difficult matter for man to duplicate. This is because the cost of seed is all out of proportion with the success which he can expect from broadcast sowing in the place where he expects the forest to stand eventually. On the other hand he can improve on nature's method by sowing a smaller amount of seed in a place where it can be guarded when soil conditions are better, and where the resulting plants may be so cared for that there is a small natural loss. In other words, he can give the trees a start in a forest nursery. Subsequently, when the plants become sufficiently vigorous, he can transplant them into the forest or in open country better adapted to the growing of timber than to agricultural crops.

If he has properly determined the quality of the "site" as foresters say, and the adaptability of the species he is using, and if he has provided for protection from fire and other enemies, he may expect to produce a forest. In other words, the business of planting trees for forests is surrounded with just about the possibilities for success or failure that we find in raising of a crop which matures in a shorter time.

Attempts to raise forests with broadcast sowing of tree seed occurred in this country as early as 1906 in the neighborhood of the Black Hills and throughout other parts of the Dakotas, and in the fall of 1910 an enormous area of burned-over land in the Western National Forest was seeded at the request of James S. Wilson, who was then Secretary of Agriculture, and who as Secretary had control of the National Forests. Men in the Forest Service at that time did not approve of this experiment but were willing to give it a thorough trial under as many conditions as could be secured. The success attained was extremely slight and not sufficient to make this a general method.

Raising the nursery stock, however, has been more successful and there are now numerous Forest Service Nurseries located throughout the West, where stock is being raised for planting on burned-over areas and other available planting sites on National Forests. A number of the state organizations have also

taken up the growing of nursery stock to a certain extent for the purpose of reforesting barren state-owned land, but to a greater extent with the idea of furnishing well-grown nursery trees to owners of private holdings which are in need of reforestation.

New York state is foremost among the states in the Union in the production of forest nursery stock and has probably done as much planting on its State Forest Preserve as any other state in the Union. There are something over 7,000 acres of state plantations and more than 20,000 acres of private ones. Fast-growing conifers are the most widely used trees for the reason that coniferous timber is more in demand and easier to grow on short rotation. During the past year the five nurseries operated by the State Conservation Commission in New York state produced more than 8,000,000 trees.

It is not an easy thing to say just when a crop of planted trees will be ready to cut at a good profit. In searching for actual data on such questions we must take the experience of European foresters, discounting it in order to provide for the difference in site and other factors, or we must make measurements on the few early plantations which are scattered over the country, mostly in very small tracts and on plantings in the form of windbreaks or shelter-belts which are quite common throughout the United States.

Some conifers which are fast growing and are recommended for planting throughout the East are red pine, Scotch pine and Norway spruce. Among the hardwoods which are recommended for planting are red oak, white ash, green ash, Carolina poplar, black locust and basswood.

In the last few years one of the best trees for planting, the white pine, has been attacked by the white pine blister rust, a destructive disease which came to us from the domain of "Kultur" some years ago. Vast amounts of money have been spent in an endeavor to control this disease by means of destroying the species of *Ribes* upon which the disease lives during the imperfect stage. Many workers on this control problem believe that the white pine is doomed because of the excessive cost and difficulty of securing thorough work in the destruction of this temporary host.

The operation of planting is extremely simple and cheapness and efficiency is dependent as in anything else, upon good organization. A planting crew may be as small as two men in numbers; one to go ahead with a grub hoe or mattock to dig holes and the other to follow with the trees which he plants just as one would plant a tomato or a cabbage plant, except that no water is used. It is necessary, however, to keep the roots of coniferous trees moist because even the slightest amount of drying will cause the resin in the roots to harden and discount the chances of the little trees. Two good men can plant an acre a day. This means putting in 1,210 trees when spaced six by six feet. Close spacing is desirable, because the trees crowd in early life and the competition for light thus brought about stimulates height growth and at the same time makes a smaller number of knots per unit of length in the log which is finally produced. The crowding also brings about what we call natural pruning by shading out the lower branches and making it possible for clear logs to be produced.

The initial cost of establishing a plantation should not exceed $15.00 per acre, including the cost of the land, if good interest is to be expected.

Where it is possible to thin out a plantation at a profit such as might be the case in a stand of black locust where small fence posts could be secured, or in an evergreen plantation where hop poles might be a saleable product, the thinning should almost take care of the cost of the operation and may even help to pay the taxes. Bucket stock may be secured from a pine plantation in as short a time as twenty-five years and a good quality of box lumber will result in forty years.

Forest planting will probably never be widely practised on private land in this country until a more equitable system of taxation is adopted than the one in use at present. Various methods have been suggested, but there is a general feeling that the one recommended by Professor F. R. Fairchild, of Yale, based upon taxing the yield at the time of cutting, is the soundest system. Public sentiment has a long course of development ahead of it before private owners will do any great amount of

planting, for the simple reason that the general attitude of property owners follows very closely the expression of a certain old farmer. This man in reply to a forester who urged him to plant idle land on his farm said, "What has posterity ever done for me?" On the other hand, the state and government can go ahead with this business, producing along with their forests a demonstration of the idea that planting trees for forests *is* good business.

SHIRLEY W. ALLEN

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Deutzia carnea. FLESH-COLORED HYBRID DEUTZIA.
Location: Fruticetum. West Border, north of Mosholu Parkway entrance,
Hybrid.

Deutzia carnea var. **densiflora.** DENSE-FLOWERED HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia carnea var. **lactea.** MILK-WHITE HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia elegantissima. ELEGANT HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.
Hybrid.

Deutzia elegantissima var. **arcuata.** WAND HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia elegantissima var. **fasciculata.** FASCICLED HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia excellens. CHOICE HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.
Hybrid.

Deutzia Fleur de Pêche. PEACH-BLOSSOM HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.
Hybrid.

Deutzia gracilis. SLENDER DEUTZIA.
Location: Fruticetum.
Natural distribution: Japan.

Deutzia Lemoinei. LEMOINE'S DEUTZIA.
Location: Fruticetum.
Hybrid.

Deutzia Lemoinei var. **compacta.** LEMOINE'S DENSE DEUTZIA.
Location: Fruticetum.

Deutzia Lemoinei var. **compacta Avalanche.** AVALANCHE DEUTZIA.
Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Deutzia longifolia. LONG-LEAVED DEUTZIA.
Location: Fruticetum.
Natural distribution: Western China.

Deutzia magnifica. DOUBLE-FLOWERED TALL DEUTZIA.
Location: Fruticetum. West Border, north of Mosholu Parkway entrance.
Hybrid.

Deutzia magnifica var. **eburnea.** TALL IVORY DEUTZIA.
Location: Fruticetum West Border, with the above.

Deutzia magnifica var. **erecta.** ERECT TALL DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia magnifica var. **formosa.** LARGE-PANICLED TALL DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia magnifica var. **latiflora.** LARGE-FLOWERED TALL DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia magnifica var. **superba.** WHITE SINGLE-FLOWERED TALL DEUTZIA.
Location: Fruticetum. West Border, with the above.

Deutzia myriantha. MANY-FLOWERED HYBRID DEUTZIA.
Location: Fruticetum. West Border, with the above.
Hybrid.

Deutzia parviflora. SMALL-FLOWERED DEUTZIA.
Location: Fruticetum.
Natural distribution: China.

Deutzia rosea. ROSY HYBRID DEUTZIA.

Location: Fruticetum. West Border, north of Mosholu Parkway entrance.

Hybrid.

Deutzia rosea var. **campanulata.** BELL-FLOWERED HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia rosea var. **carminea.** CARMINE HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia rosea var. **eximia.** SELECT HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia rosea var. **multiflora.** MANY-FLOWERED HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia rosea var. **venusta.** GRACEFUL HYBRID DEUTZIA.

Location: Fruticetum. West Border, with the above.

Deutzia scabra var. **angustifolia.** NARROW-LEAVED ROUGH DEUTZIA.

Location: Fruticetum.

Natural distribution: China and Japan.

Deutzia scabra var. **candidissima.** SNOW-WHITE DOUBLE DEUTZIA.

Location: Fruticetum.

Deutzia scabra var. **Fortunei.** FORTUNE'S DEUTZIA.

Location: Fruticetum.

Deutzia scabra var. **plena.** DOUBLE DEUTZIA.

Location: Fruticetum.

Deutzia scabra var. **plena Pride of Rochester.** PRIDE OF ROCHESTER DEUTZIA.

Location: Fruticetum.

Deutzia scabra var. **Watereri.** WATERER'S DEUTZIA.

Location: Fruticetum.

Deutzia Schneideriana var. **laxiflora.** LOOSE-FLOWERED DEUTZIA.

Location: Fruticetum.

Natural distribution: Western China.

Hydrangea. HYDRANGEA

Hydrangea arborescens. WILD HYDRANGEA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Hydrangea arborescens var. **cordata.** HEART-LEAVED WILD HYDRANGEA.
Location: Fruticetum.

Hydrangea arborescens var. **grandiflora.** LARGE-FLOWERED WILD HYDRANGEA.
Location: Fruticetum.

Hydrangea Bretschneideri. BRETSCHNEIDER'S HYDRANGEA.
Location: Fruticetum.
Natural distribution: Northern China.

Hydrangea cinerea. GRAY HYDRANGEA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Hydrangea paniculata. PANICLED HYDRANGEA.
Location: Fruticetum.
Natural distribution: China and Japan.

Hydrangea paniculata var. **floribunda.** MANY-FLOWERED PANICLED HYDRANGEA.
Location: Fruticetum.

Hydrangea paniculata var. **grandiflora.** LAWN HYDRANGEA.
Location: Fruticetum. Along path, near 200th Street entrance.

Hydrangea paniculata var. **minor.** SMALL-PANICLED HYDRANGEA.
Location: Fruticetum.

Hydrangea quercifolia. OAK-LEAVED HYDRANGEA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Hydrangea radiata. SILVERY-LEAVED HYDRANGEA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Hydrangea xanthoneura. YELLOW-VEINED HYDRANGEA.
Location: Fruticetum.
Natural distribution: Western China.

ITEACEAE. Virginia Willow Family

Itea. Virginia Willow

Itea virginica. Virginia Willow.
Location: Fruticetum.
Natural distribution: Southeastern United States.

GROSSULARIACEAE Gooseberry Family

Grossularia. Gooseberry

Grossularia curvata. Southern Gooseberry.
Location: Fruticetum. West end of Long bridge.
Natural distribution: Georgia and Alabama.
Grossularia Cynosbati. Wild Gooseberry.
Location: Fruticetum.
Natural distribution: Eastern North America.
Grossularia divarcata var. **pubiflora.** Hairy Western Gooseberry.
Location: Fruticetum.
Natural distribution: Western North America.
Grossularia hirtella. Low Wild Gooseberry.
Location: Fruticetum.
Natural distribution: Northeastern North America.
Grossularia pinetorum. Pineland Gooseberry.
Location: Fruticetum.
Natural distribution: New Mexico and Arizona.
Grossularia rotundifolia. Eastern Wild Gooseberry.
Location: Fruticetum.
Natural distribution: Eastern United States.

Ribes. Currant

Ribes alpinum. Mountain Currant.
Location: Fruticetum.
Natural distribution: Europe.
Ribes americanum. Wild Black Currant.
Location: Fruticetum.
Natural distribution: Northern North America.

Ribes aureum. WESTERN GOLDEN CURRANT.

Location: Fruticetum.

Natural distribution: Western North America.

CONFERENCE NOTES FOR FEBRUARY

The conference of the scientific staff and registered students of the Garden for February was held on the afternoon of February 6. The following program was presented:

"Recent botanical explorations in Florida," by Dr. J. K. Small.

"Observations on tulips," by Dr. A. B. Stout.

Dr. Small described and exhibited specimens of numerous species studied during recent explorations in Florida. Some of these are new species. Special mention was made of species of *Hicoria*, *Opuntia*, *Diospyros*, and *Zamia*. A full account of the explorations are published in this number of the *Journal*.

Dr. Stout reported on results of studies with tulips with special reference to (*a*) abnormal and premature development, (*b*) flower development during summer in stored bulbs and its relation to blindness, and (*c*) tulip rots. A report of these observations with illustrations appeared in the February number of the *Journal of the Horticultural Society of New York*.

A. B. STOUT,
Secretary of the Conference

NOTES, NEWS, AND COMMENT

A second installment of the specimens collected in Colombia by Dr. F. W. Pennell was recently received at the Garden and a set is being prepared for mounting and incorporating in the herbarium in connection with work on the flora of northern South America.

Several collections of specimens from Jamaica, West Indies, made in coöperation with the Public Gardens, Jamaica, have reached the Garden. A set of the plants is being incorporated in the herbarium, while the duplicates are being prepared for distribution to other institutions.

Prof. H. H. Whetzel, of Cornell University, recently spent a few days at the Garden looking over literature and fungi belonging to the genus *Sclerotinia*, preparatory to working over this and allied genera for *North American Flora*.

Mr. Simon Davis, of Brookline, Massachusetts, an enthusiastic collector of fungi, spent a day at the Garden talking over plans for the summer collecting. Mr. Davis has collected many rare species of fungi in his region.

At this season of the year special effort should be made to remove all bag-worms from infected trees and shrubs, since these old bags contain the eggs for the spring brood. Bagworms are especially destructive to various evergreens, and where hidden by dense foliage, they often escape notice until they have accomplished considerable damage. The principal evergreen plantings of the Garden have been gone over in order to locate the infected areas and steps are being taken to check the destructive work of this insect during the coming season.

On the afternoon of February 27, about 500 biology pupils from the Evander Childs High School assembled in the lecture hall of the museum building to hear a lecture by Mr. Henry G. Parsons, of the Garden staff, on "How to Make and Care for a Home Garden." Mr. Mann, Mr. Hewitt, and several other biology teachers were present and gave their enthusiastic support to this effort to arouse an interest in the cultivation of as much vacant land as possible withing the limits of the City.

Mr. Worthington G. Smith, celebrated for his illustrations of British fungi, died November 1, 1917. Several other famous

mycologists died last year, among them Dr. P. A. Karsten, of Finland; Dr. Paul Hariot, of France; Professor George Massee, of England; and Dr. Charles H. Peck, of America.

At a recent meeting of the Torrey Botanical Club, Dr. W. A. Murrill spoke of his investigations of the gill-fungi of tropical North America, which he has just completed, the final paper on this subject appearing in the March number of *Mycologia*. Some of the larger genera were mentioned and the number of species in them compared with those of temperate regions. Of the 525 tropical species recognized by Dr. Murrill in his studies, 300 have been described by him as new.

The poplar canker, *Dothichiza populea*, was very destructive last year. This disease was introduced from Europe several years ago, and is now quite widely distributed in New York and New Jersey, as well as elsewhere. The tree most seriously affected is the Lombardy poplar, although the Carolina poplar suffers considerably. No remedy has been found. The best means of checking the disease consists in cutting and burning affected trees as soon as they are discovered and in keeping a careful watch over nursery stock.

In the latest number of the memoirs (*Memorias*) of the Cuban "Felipe Poey" society of natural history, the general secretary, Dr. Arístides Mestre, gives an interesting summary of the activities of the society during the years 1916 and 1917 in various branches of natural science. He closes his sketch with a brief account of the newly-elected honorary members of the society, including Dr. N. L. Britton, and expresses appreciation of the work done by Dr. and Mrs. Britton and other members of the staff of the New York Botanical Garden upon the flora of Cuba, in coöperation with Brother León and Dr. Juan T. Roig.

Professor Romyn Hitchcock, of Ithaca, New York, visited the Garden on March 2 for the purpose of consulting the collections of Characeae and the literature bearing upon this group of plants.

Professor Hitchcock was editor of the first seven volumes of *The American Monthly Microscopical Journal* from 1880 to 1887. Since that time he has been variously occupied as a professor of chemistry in Japan, as one of the curators of the U. S. National Museum, as a commissioner to China for the Columbian Exposition, and as a lecturer on economics.

Prof. H. H. Whetzel, leader of the plant disease survey work of the state of New York in coöperation with the United States Department of Agriculture, is soliciting the collaboration of all institutions in the state which are interested in mycology or plant-disease work of any kind. The object of this work is to gain a detailed knowledge of the distribution and prevalence of the principal diseases of food-plants, which knowledge is to be used as a basis in waging a more intelligent campaign against such diseases and thereby increasing our food production. Dr. Fred J. Seaver has been appointed as representative of the New York Botanical Garden to coöperate with the state leader in this work.

Meteorology for February: The total precipitation for February was 2.59 inches of which 0.25 inch (2½ inches snow measurement) fell as snow. The snow which had covered the ground continuously since the 14th of December melted for most part during the week ending on the 16th. On the 11th the ice on the lakes east of the Museum Building was 19 inches thick. The maximum temperatures for each week were 54° on the 7th, 36° on the 15th, 57° on the 20th, and *60° on the 25th*. The minimum temperatures were *−6° on the 5th*, 13° on the 18th, and 7° on the 22d.

ACCESSIONS

MUSEUM AND HERBARIUM

29 specimens of *Polygonum* from eastern North America. (By exchange with Harvard University.)

1 specimen of a Labiate from Michigan. (Given by Mr. K. K. Mackenzie.)

16 specimens of hepaticae from Mexico. (By exchange with Professor A. W. Evans.)

102 specimens of grasses from North America. (By exchange with the United States National Museum.)

35 specimens of flowering plants from Colorado. (By exchange with Mr. Ira W. Clokey.)

3 specimens of flowering plants from Oregon. (By exchange with Mr. J. H. Floodman.)

28 specimens of hepaticae from the United States. (By exchange with Professor A. W. Evans.)

3 specimens of fungi from Ontario, Canada. (By exchange with Professor John Dearness.)

1 photograph of *Volvaria speciosa* from Ontario, Canada. (By exchange with Professor John Dearness.)

1 specimen of *Gymnopus velutipes* from Utah. By exchange with Professor A. O. Garrett.)

1 specimen of *Clavaria* from Washington. (By exchange with Miss M. M. Kenny.)

15 specimens of fungi from Kentucky. (By exchange with Dr. Michael Levine.)

2 specimens of fungi from Washington, D. C. (Collected by Dr. J. N. Rose.)

14 specimens of fungi from New York. (By exchange with Mr. Stewart H. Burnham.)

24 specimens of fungi from Washington. (By exchange with Mr. Geo. Satoris.)

2 specimens of fungi from Montana and Indiana. (By exchange with Dr. James R. Weir.)

41 specimens of flowering plants from the Penngewarset Valley, New Hampshire. (By exchange with Harvard University.)

Library Accessions from November 1, 1917 to February 28, 1918

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Vol. 3, part 1, 1910. Nectriaceae—Fimetariaceae.

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Vol. 9 (now complete), parts 1 and 2, 1907; part 3, 1910; part 4, 1915; parts 5, 6, and 7, 1916. Polyporaceae—Agaricaceae (pars). (Parts 1 and 2 no longer sold separately.)

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Vol. 15, parts 1 and 2, 1913. Sphagnaceae—Leucobryaceae.

Vol. 16, part 1, 1909. Ophioglossaceae—Cyatheaceae (pars).

Vol. 17, part 1, 1909; part 2, 1912; part 3, 1915. Typhaceae—Poaceae (pars).

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JOURNAL

OF

The New York Botanical Garden

EDITOR

KENNETH ROWLAND BOYNTON

Head Gardener's Assistant

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JOURNAL

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JOHN ADOLPH SHAFER

Dr. John Adolph Shafer, one of our most efficient botanical collectors, died in a hospital near Pittsburgh, Pennsylvania, after a long illness, on February 1st, 1918, in the fifty-fifth year of his age.

I first came to know him during a meeting of the American Association for the Advancement of Science held at Pittsburgh in the summer of 1902, at which time he was employed by the Carnegie Museum in that city as custodian of botany, a post which he filled from 1897 to 1903. He was then an enthusiastic collector and observer of plants, as I had known from previous correspondence with him, and he was diligent in accumulating specimens for the Carnegie Museum.

Upon my invitation, he spent the month of September, 1902, at the New York Botanical Garden, engaged in selecting duplicates from our collections for his institution. During March, 1903, he was with me in Matanzas and Havana Provinces, Cuba,* making collections which were divided between the Garden and the Carnegie Museum; he remained in Cuba, continuing this work until early in May of that year. This was the first of his numerous trips to the West Indies; he spent part of that summer with me in New York, engaged in the study of these collections. At that time he indicated his desire of becoming associated with the Garden, and in January, 1904, it was made possible to appoint him to our position of museum custodian, a post which he held for over five years, and during that period

* Jour. N. Y. Bot. Gard. 4: 95–99.

[Journal for April, 1918 (19): 69–96 was issued April 30, 1918.]

was employed much of the time in work on the economic collections, his early training as a pharmacist fitting him well for these duties. The University of Western Pennsylvania awarded him the honorary degree of Doctor of Pharmacy on June 16, 1904. His account of the American Sennas, describing *Cassia Medsgeri*, was published in December of that year.*

Early in 1907, he was commissioned to visit the West Indian island of Montserrat, where he made a large collection of living plants and herbarium specimens.† He assisted me in the preparation of the volume "North American Trees," published in 1908. In January, 1907, he was sent to northeastern Cuba, and for several months prosecuted botanical exploration in the provinces of Oriente and Camaguey, and returned to northern Oriente later in the year.‡

Museum work had proved unsuitable for Dr. Shafer's health, and during this period he decided to relinquish it. On his return from Cuba, in the spring of 1910, he proceeded to his home near Pittsburgh and occupied himself in gardening and as a florist, but he greatly desired to continue tropical botanical exploration during the winter season, and this we were able to make possible for him from time to time. Late in 1911, we commissioned him for collecting again in Cuba, and he spent several months of that winter in Pinar del Rio, followed by work in Santa Clara and Oriente,§ and he was again sent to Pinar del Rio in 1912.‖ He accompanied me during a three months' West Indian trip commencing in January, 1913, during which period we made collections on St. Thomas, St. Jan, Tortola, Virgin Gorda, Anagada, Porto Rico, and Curacao.¶ In the early part of 1914, we sent him to explore the Porto Rican island of Vieques, when he made the first comprehensive collection of its plants.** Later in 1914, he made collections in the mountains of eastern Porto Rico.††

* Torreya **4**: 177–181.
† Jour. N. Y. Bot. Gard. **8**: 81–88.
‡ Jour. N. Y. Bot. Gard. **11**: 147–159; 202-221; **12**: 92–99.
§ Jour. N. Y. Bot. Gard. **13**: 136-147; 169–172.
‖ Jour. N. Y. Bot. Gard. **14**: 44–49.
¶ Jour. N. Y. Bot. Gard. **14**: 99–109.
** Jour. N. Y. Bot. Gard. **15**: 103–105.
†† Jour. N. Y. Bot. Gard. **16**: 33 35.

During the prosecution of the investigation of the Cactaceae carried on by the Carnegie Institution of Washington in coöperation with the New York Botanical Garden and the United States National Museum, it became desirable in 1916 to obtain additional plants and specimens from Argentina and Paraguay. This errand was offered to Dr. Shafer, and gladly accepted by him, as he had long desired to visit South America. He spent about six months, from November, 1916, to April, 1917, on this trip,* and brought back large collections which have yielded much important information.

Dr. Shafer's several Cuban botanical collections, taken all together, are the largest ever made and studied from that island, and in scientific importance are second only to those of Charles Wright, brought together from 1859 to 1864; they contain specimens of several hundred species new to science and provide a great fund of information relative to habitat and geographic distribution of Cuban species, and many plants previously known from other lands are shown by these collections to inhabit Cuba.

Two Cuban genera have been dedicated to Dr. Shafer, the one *Shaferocharis*, in the Madder Family, the other *Shafera*, in the Thistle Family. The specimens on which both these genera are based were found by him at Camp La Gloria, south of the Sierra Moa, western Oriente, in December, 1910. He is further commemorated in Cuban botany by species in the genera *Tricera*, *Purdiaea*, *Coccolobis*, *Tabebuia*, *Varronia*, *Eupatorium*, *Anastraphia*, *Heptanthus*, *Baccharis*, *Senecio*, *Zanthoxylum*, *Ravenia*, *Rondeletia*, *Rhamnidium*, *Cassia*, *Passiflora*, *Rynchospora*, *Hyptis*, *Eugenia*, *Miconia*, *Gesneria*, *Lobelia*, *Myrica*, *Rhacoma*, and *Agaricus*. His work on Vieques Island is commemorated by *Malpighia Shaferi*, and on Montserrat by a species of the fungus *Fuscoporella*. Several of the cacti new to science found by him in South America are also named in his honor.

Dr. Shafer was coöperative and efficient in his duties, and a delightful companion. In the field, he would go through with all kinds of privations without hesitation in order to accomplish his object. We deeply mourn his loss.

N. L. Britton.

* Jour. N. Y. Bot. Gard. 19: 21–43.

THE BLACK LOCUST TREE AND ITS INSECT ENEMIES

(WITH PLATE 212)

The black locust (*Robinia Pseudo-Acacia*) is a native of North America and occurs naturally east of the Alleghany Mountains from New York to Louisiana. It has spread, however, or been introduced throughout the eastern half of North America as well as in other parts of the world. Being a member of the pea family, its flowers which resemble those of the pea are borne in large, attractive clusters and the tree would doubtless become a valuable ornamental were it not for the obstacles in the way of its cultivation.

The planting of the black locust for ornamental purposes or for economic uses has been attempted from time to time and occasionally on a large scale but each time the attempt has been a dismal failure due almost entirely to the destructiveness of its insect enemies, especially to the locust borer (*Cyllene Robiniae*) which honeycombs the trunks and larger branches, rendering the wood useless and so disfiguring the tree as to make it worthless as an ornamental.

The keeping qualities of the wood of this tree are so remarkable that it has been repeatedly suggested for such uses as railroad ties and other purposes where great resistance to decay is required. We have in our possession a piece of wood from this tree which it was claimed on indisputable evidence had been used for more than fifty years (1863–1915) as a sleeper for a floor in a cellar under the most trying conditions, yet, with the exception of a very thin outer layer, is sound and shows no signs of decay. It is this quality which has stimulated the attempt to grow this tree on a large scale for railroad ties.

In 1906, Mr. Charles A. White discussed the possibilities of black locust cultivation in a rather extended article on "The Black Locust Tree and Its Despoliation." His conclusions are so nearly in line with our experiences and the experiences of others who have attempted the cultivation of the tree that we feel justified in quoting his introductory paragraph which reads as follows:

LOCUST PLANTATIONS RUINED BY THE BORERS

"Within the past few years an increasing interest has been manifested in the black locust tree, *Robinia pseudacacia*. Many persons have begun to propagate it, not only as a wayside tree, but as a forest product; and issues of the public press lately have contained many articles and paragraphs pointing out the excellent qualities of the wood and recommending its general cultivation for economic uses. Several of the articles referred to have mentioned the fact that one of the great railroad companies has, within the past two years, planted on its Pennsylvania lands nearly a million and a half of trees of this species with the intention of using the product for railroad ties and fence posts, and for other purposes requiring exceptionally durable wood. It has been publicly announced that large additions to that company's planting of this tree are to be made, and it is also known that many smaller, but still extensive, enterprises of this kind, under both corporate and individual management, are in progress in different parts of our country. The aggregate of these enterprises requires the expenditure of so much labor and money before any profitable returns could be expected, that one who is acquainted with the past history of the tree can not but wonder at the apparent lack of business precaution, or of sound advice, which they imply. The fateful destiny of this tree has been long known and until recently it has been generally neglected; but by most persons the facts concerning it apparently are now forgotten or disregarded. From personal observations, extending through many years and over a large part of the United States and adjoining parts of Canada and Mexico, I am convinced that all attempts to cultivate this tree in any part of North America, with the possible exception presently to be mentioned, will result in failure so far as suitable returns in practical value of the product is concerned. The subject therefore has, with comparative suddenness, become of public importance, and my chief object in writing this article is the utterance of a public caution concerning it, especially directed to industrial interests."

The above paragraph from Mr. White's article which was written both as a prediction and a caution against the cultivation

of this tree have been so literally fulfilled that it seems ve fitting to recall them at this time. Again he writes: "In Europ especially, where its American insect despoilers have never bee where the indigenous insects never molest it, and where it readi adapts itself to the local climatic and terreous conditions, it h always grown thriftily and symmetrically, reaching a maximu size comparable with that of the oaks. Being there esteemed . an oranmental tree, it is often grown in public parks, and it also much cultivated in preserved forests for its valuable wood

Our own attempts to grow the black locust as an ornament in the New York Botanical Garden have been unsuccessful ar while on account of the great vitality of the species it seems continue to exist under conditions which would be fatal to mo trees it is always disfigured by the repeated attacks of the bore It was in connection with the cutting out of infected tre within our own grounds that the writer's attention was fir called to this matter.

About this time (1914), having learned that the Pennsylvani railroad company had started large plantations of black locu to be used as ties the writer became curious to know how the had succeeded in protecting the trees from their insect enemie Accordingly a letter of inquiry was addressed to the forester this company and in reply it was learned that two millior of seedlings were planted by this company between 1902 an 1908. In 1914 not one of these could be found which was fre from the borer. The pruning of the trees seemed to make n difference and we were further informed that from their exper ence it seemed inadvisable to attempt to cultivate this tree, a least in pure stand, and from our own experience it seems ju as inadvisable to attempt to cultivate it even in mixed stand The pictures accompanying this article show the condition two of these plantations as they appeared in 1913. These ar evidently some of the plantations referred to by Mr. White i his article quoted above and the results are just as predicted b him at that time.

Enemies of the Locust

There are at least three different insects which attack the black locust, one attacking the leaves, one the twigs and the third, commonly known as the locust borer, attacking the trunks and large branches of the tree. It is only the last of the three which is to be considered in this article since this one alone is enough to discourage the cultivation of the tree entirely without the aid of the other two.

The adult stage of the locust borer is a large, beautiful beetle nearly an inch in length. The beetle is black, with a number of bright yellow bands across its back, giving it a very attractive appearance. It seems to be a very optimistic insect and may often be found gayly flitting about goldenrods and other bright-colored flowering plants, where it feeds sparingly on the pollen from these flowers. The beetle is short-lived and dies soon after completing the process of reproduction. After mating the female soon flies back to the locust tree where her eggs are deposited in the soft tissue just underneath the bark. The young larva burrows into the wood and completes its growth about one year from the time the eggs are deposited. The larva when full grown is a white grub about one inch in length and is a voracious feeder. The burrows are about the diameter of an ordinary lead-pencil and the wood which is chewed up is passed through the body of the grub, the digestible parts taken out and the refuse deposited in the form of rather coarse saw-dust-like particles. This partially digested wood is often thrown out in such large quantities as to form little heaps at the base of the tree when badly infected. The wood is so thoroughly burrowed in this way that the branches are broken off and the whole plantation given the appearance of a bullet-riddled forest on a European battlefield.

Possible Remedies

Like all other insects which have resorted to trench warfare this borer is very difficult to combat by artificial means. No effective remedy applicable on a large scale has yet been discovered. The application of materials which are so repulsive to the insect as to discourage the female from laying her eggs in

the bark have been tried with some success, but in order to be effective such materials must be applied to the trunk and all branches two inches in diameter, so that this treatment becomes impractical on a large scale.

The conclusion drawn by Mr. White is that the black locust tree in the land of its origin is doomed, not to total extinction, but to slow destruction by its insect enemies as a profitable natural product and we might add that it appears to be equally doomed as a valuable ornamental unless some section of our country may be found which is so unfavorable to its insect enemies as to offer natural protection to this otherwise valuable tree.

FRED J. SEAVER.

EXPLANATION OF PLATE

FIG. 1. Plantation of black locust trees at Kinzers, Pennsylvania. This plantation was made in the spring of 1904 with one-year-old seedlings planted 8 x 8 feet. The photograph shows the condition of this plantation in March, 1913.

FIG. 2. Plantation near Leaman Place, Pennsylvania. This plantation was made at the same time and in the same manner as that shown in Fig. 1 and the photograph was also made in March, 1913. This plantation was underplanted with red oak and Scotch pine, but the ruined locusts sprouted so vigorously that the entire plantation proved to be a failure.

ALBERTINA TAYLOR RUSSELL

Mrs. Archibald Douglas Russell, a member of the Women's Auxiliary of the New York Botanical Garden since the organization of the Auxiliary in February, 1914, died at her home in New York City on February 11, 1918.

Mrs. Russell was greatly interested in everything pertaining to gardens and to gardening, and she loved flowers and plants. Her influence in leading others to the study and observation of natural objects was very valuable. Her knowledge of plants, both wild and cultivated, was broad and accurate.

She was an active and efficient member of the Women's Auxiliary, attending every meeting possible for her, and she visited the institution frequently and aided its work in many ways.

Resolved: That the members of the Women's Auxiliary of the

New York Botanical Garden deeply deplore the loss of one who was endeared to us all by her lovely character and enthusiasm for the study of nature and her wisdom in counsel.

Resolved: That the foregoing preamble and resolution be entered on the minutes of the Auxiliary, published in the Garden's *Journal*, and that a copy be sent to her bereaved husband.

Adopted by the Women's Auxiliary, April 18, 1918.

A RED PINE PLANTATION

Through the continued interest of Dr. Walter B. James in demonstrating planting for forests, and the coöperation of Hon. George D. Pratt, conservation commissioner, the New York Botanical Garden received this spring 3,000 four-year-old red pine transplants for clothing the bare rocky hill along the Southern Boulevard facing the Fordham Hospital. About 2,000 of these little trees were required for this area, and about 1,000 of them have been put in the nursery to replace plants which may fail.

The red pine, or Canadian pine (*Pinus resinosa*), inhabits naturally the northeastern part of North America, ranging from Newfoundland to Manitoba southerly into Massachusetts, Pennsylvania and Wisconsin. The latitude of New York City is therefore considerably south of its natural distribution, the nearest points of its southern range being in Greene County, New York, and Luzerne and Wayne Counties, Pennsylvania. There is a record of its existence many years ago at Inwood, New York City, but no specimen to verify this has been preserved in any of our local botanical collections. The present planting for forest demonstration purposes will be a very interesting experiment, and should show within a few years whether this valuable timber tree will succeed this far south of the natural distribution of the species. We have had specimens of the red pine in the Pinetum for a number of years, some of which have succeeded very well, but others were damaged during one of our colder winters; this damage was unexpected by us, as we had

anticipated the greater summer heat would be more likely to retard or prevent the development of the tree than any cold weather would.

The plants contributed by the New York State Conservation Commission average about 8 inches in height, and have been planted four feet apart; the ridge on which they are located slopes east and west, so that the drainage is perfect and the soil, while somewhat stony, is for the most part very good; the top of the ridge shows large outcrops of schistose gneissic rock. Located immediately across the Southern Boulevard from the Fordham Hospital, if the plantation succeeds, it will become a pleasing feature to patients, and the aroma of the pine on winds blowing toward the hospital will be of hygienic benefit.

In this connection, it may be reported that the white pine planting made in the spring of 1916, through the same kindly coöperation, on the hill just east of the one chosen for the red pine, has been developing normally and satisfactorily, and it has been of great interest to many thousand visitors. It has been provided with signs at intervals, bearing the lettering "Demonstration White Pine Plantation, Conservation Commission, State of New York," and the new red pine plantation has now been similarly labeled.

N. L. Britton.

SPRING INSPECTION OF GROUNDS, BUILDINGS AND COLLECTIONS

Some 300 members and their guests participated in the spring inspection of grounds, buildings and collections on the afternoon of May 2d. The party assembled at the Botanical Garden Station Plaza at three o'clock, and viewed there the preparation for planting a new dahlia garden, which is to extend from the station north nearly to the Mosholu Parkway approach, as a part of the west border screen. The first stop was at Conservatory Range 1, the party walking up the western approach, through the flower gardens, and entering house 6, where Dr. Stout called

attention to the collection of succulents. The party then passed through house 5 into house 4, where Mr. Boynton described some of the more striking tropical plants in this collection, then through houses 3 and 2 into house 1, where Mr. Wilson spoke on the palm collection. Here a detour was made into the Conservatory Court to view the tulip beds, thence back through the palm house to the flower gardens north of the range to the Pinetum Plaza, where the motor cars were again entered and driven to Conservatory Range 2, to view the construction of the new greenhouses given by Daniel Guggenheim and Murry Guggenheim. At this point Dr. Britton exhibited the water-color designs for these two greenhouses, and remarked on the proposed features of the installation, including provision for a lecture room in the Central Display Greenhouse. The party then walked to the collection of Japanese cherries nearby; unfortunately, the severe winter weather of January had damaged the buds of this collection and their bloom this year was very imperfect, but the crab apples were in full flower and much enjoyed. Entering the cars again, the next stop was made at the Rose Garden, where the planting of many additional rose bushes in coöperation with the Horticultural Society of New York was viewed, and the completion of the grading of banks on the west side of this garden was seen. At the Rose Garden stairway, given last year by Mrs. Robert E. Westcott, a bronze tablet recording this gift was unveiled by Mrs. George D. Pratt on behalf of the Women's Auxiliary, and Mrs. Pratt made appreciative remarks relative to this gift and called attention to the many other features planned by the Endowment Committee for the further development of the grounds when additional funds can be obtained.

Proceeding to the Iris Garden, some of the party walked north to view the planting of the new Red Pine Plantation established in coöperation with the Conservation Commission of the State of New York and the planting of a large number of gladiolus bulbs in the Horticultural Garden, then through the southern end of the Herbaceous Garden and then to the Museum Building, where tea was served at five o'clock.

There were exhibits in the Museum Building of rare and ele-

gant works on Botany and Horticulture, including volumes given by Mrs. George D. Pratt; of the water-color paintings of new buildings and other structures planned for the further development of the Garden by John R. Brinley and Louis F. Bird under the direction of the Endowment Committee, and of original paintings of plants by Mary E. Eaton for reproduction in *Addisonia* and in the Monograph of the Cactus Family.

The weather was perfect.

N. L. BRITTON.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Ribes cereum. WESTERN CURRANT.

Location: Fruticetum.

Natural distribution: Western North America.

Ribes diacantha. SIBERIAN CURRANT.

Location: Fruticetum.

Natural distribution: Northern Asia.

Ribes fasciculatum. BUNCH-FLOWERED JAPANESE CURRANT.

Location: Fruticetum.

Natural distribution: Japan.

Ribes fasiculatum var. **chinense.** BUNCH-FLOWERED CHINESE CURRANT.

Location: Fruticetum.

Natural distribution: Northern China.

Ribes glandulosum. FETID CURRANT.

Location: Fruticetum.

Natural distribution: Northern North America.

Ribes Gordonianum. GORDON'S CURRANT.

Location: Fruticetum.

Hybrid.

Ribes nigrum. EUROPEAN BLACK CURRANT.

Location: Fruticetum.

Natural distribution: Europe and northern Asia.

Ribes odoratum. GOLDEN CURRANT.
Location: Fruticetum. Opposite approach to Elevated Railway.
Natural distribution: South Dakota to Texas.
Ribes orientale. ORIENTAL CURRANT.
Location: Fruticetum.
Natural distribution: Southeastern Europe and western Asia.
Ribes sanguineum. RED-FLOWERED WESTERN CURRANT.
Location: Fruticetum.
Natural distribution: Northwestern North America.
Ribes sanguineum var. **albescens.** WHITE-FLOWERED WESTERN CURRANT.
Location: Fruticetum.

HAMAMELIDACEAE. Witch-hazel Family

Liquidambar. SWEET GUM

Liquidambar Styraciflua. SWEET GUM.
Location: Wild: common. A fine group of trees south of the Museum. Along north path, north shore of west lake. Along path from Fountain Enclosure to 200th St. entrance.

Parrotia. IRONWOOD

Parrotia persica. PERSIAN IRONWOOD.
Location: Fruticetum.
Natural distribution: Northern Persia.

Corylopsis. CORYLOPSIS

Corylopsis spicata. COMMON CORYLOPSIS.
Location: Fruticetum.
Natural distribution: Japan.

Fothergilla. FOTHERGILLA

Fothergilla Gardeni. WITCH ALDER.
Location: Fruticetum.
Natural distribution: Southeastern United States.
Fothergilla major. LARGER WITCH ALDER.
Location: Fruticetum.
Natural distribution: North Carolina to Alabama.

Hamamelis. Witch Hazel

Hamamelis japonica. Japanese Witch Hazel.
Location: Fruticetum.
Natural distribution: Japan.

Hamamelis mollis. Chinese Witch Hazel.
Location: Fruticetum.
Natural distribution: China.

Hamamelis virginiana. Witch Hazel.
Location: Fruticetum. Wild: common.
Natural distribution: Eastern North America.

PLATANACEAE. Plane-tree Family

Platanus. Plane-tree

Platanus acerifolia. London Plane.
Location: Arboretum. Near Station Plaza.
Hybrid.

Platanus occidentalis. Button-wood.
Location: Arboretum. Near Station Plaza. Drinking Fountain east of Museum. Along west path, Herbaceous Grounds. Wild: common.

ROSACEAE. Rose Family

Opulaster. Ninebark

Opulaster intermedius. Prairie Ninebark.
Location: Fruticetum.
Natural distribution: Central United States.

Opulaster opulifolius. Eastern Ninebark.
Location: Fruticetum.
Natural distribution: Northeastern North America.

Opulaster opulifolius var. **luteus.** Golden Eastern Ninebark.
Location: Fruticetum. At approach to Elevated Railway.

Opulaster opulifolius var. **tomentellus.** Hairy Eastern Ninebark.
Location: Fruticetum.

Neillia. NEILLIA

Neillia sinensis. CHINESE NEILLIA.
Location: Fruticetum.
Natural distribution: China.

Stephanandra. STEPHANANDRA

Stephanandra incisa (*Stephanandra flexuosa*). COMMON STEPHANANDRA.
Location: Fruticetum.
Natural distribution: Japan and southern Corea.
Stephanandra Tanakae. LARGE-LEAVED STEPHANANDRA.
Location: Fruticetum.
Natural distribution: Japan.

Spiraea. SPIRAEA

Spiraea alba. HAIRY MEADOW-SWEET.
Location: Fruticetum.
Natural distribution: Eastern United States.
Spiraea albiflora. JAPANESE WHITE SPIRAEA.
Location: Fruticetum. Shrub group west of Museum.
Natural distribution: Japan.
Spiraea alpina. MOUNTAIN SPIRAEA.
Location: Fruticetum.
Natural distribution: Northeastern Asia.
Spiraea arguta. ZABEL'S SPIRAEA.
Location: Fruticetum. Shrub group near 200th St. entrance.
Hybrid.
Spiraea Billiardii. BILLIARD'S SPIRAEA.
Location: Fruticetum.
Hybrid.
Spiraea Billiardii var. alba. BILLIARD'S WHITE SPIRAEA.
Location: Fruticetum.
Spiraea blanda. SWEET SPIRAEA.
Location: Fruticetum.
Hybrid.
Spiraea brachybotrys. SHORT-CLUSTERED SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea Bumalda. BUMALDA SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea Bumalda var. **Anthony Waterer.** ANTHONY WATERER SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea canescens. CUNEATE SPIRAEA.
Location: Fruticetum.
Natural distribution: Asia.

CONFERENCE NOTES FOR MARCH

The March conference of the scientific staff and registered students of the Garden was held in the laboratory of the museum building on the afternoon of March 6.

The program for this conference was as follows:
"American species of *Riccia*," by Dr. M. A. Howe.
"Mitochondria in plant and animal cells," by Prof. W. C. Twiss.

Dr. Marshall A. Howe discussed "The Ricciaceae of North America," a systematic treatment of which he is preparing for the "North American Flora." After the general morphological characters of the family were reviewed, it was remarked that all the recognized generic and subgeneric groups have representatives in the United States, and the characteristics of the groups *Riccia*, *Ricciocarpus*, and *Oxymitra* (*Tessellina*), which are admittedly genera, and of *Ricciella* and *Thallocarpus*, which should perhaps be treated as subgenera of *Riccia*, were pointed out. Living specimens of various American and European species, some of which have been under cultivation and observation for four years in the Propagating House of the Garden, were exhibited. Photographs of other living specimens were also shown, some of these being of particular interest in recording changes of form of the thallus under cultivation. One of these disclosed the narrow form of the southern *Riccia Donnellii* developing directly into the usual broad form. The characters which seem to be most dependable in distinguishing species were discussed.

Professor Twiss gave a general review of what is known regarding the occurrence of mitochondria in plant and animal cells and presented a brief summary of theories regarding their function. He made a demonstration of microscopical preparations from his own researches showing mitochondria in vegetative tissues of the corn plant and in the tissues of reproductive organs from the grasshopper.

A. B. STOUT,
Secretary of the Conference

NOTES, NEWS AND COMMENT

The following botanists have recently registered in the library: Dr. H. Hus, New York, N. Y.; Professor Romyn Hitchcock, and Professor W. W. Rowlee, Ithaca, N. Y.; Miss Annie Lorenz, Hartford, Conn.; Dr. F. S. Blake, and Dr. J. N. Rose, Washington, D. C., Miss C. C. Haynes, Highlands, N. J., and Dr. John W. Harshberger, Philadelphia, Pa.

Dr. Britton's "Flora of Bermuda," an octavo book of 585 pages, with 519 text illustrations and a colored frontispiece, appeared in March; it is published by Charles Scribner's Sons. The work contains descriptions and illustrations of all the native and naturalized flowering plants, ferns, mosses, and hepatics of Bermuda, together with descriptive chapters on the lower cryptogams, that on the lichens contributed by Professor Lincoln W. Riddle, of Wellesley College, that on the fungi by Dr. Fred J. Seaver, and that on the algae by Dr. Marshall A. Howe. The chapter on mosses was contributed by Mrs. Britton and that on the hepatics by Professor A. W. Evans of Yale University. In addition to the kinds of native and naturalized plants, brief descriptions are given of the cultivated plants of the colony. The work is perhaps the most complete description of all the plants of a small area that has ever been published.

The series of water-color paintings illustrating structures needed for the further development of the New York Bo-

tanical Garden, prepared by Messrs. John R. Brinley and Louis F. Bird under the direction of the Endowment Committee of the Board of Managers, was exhibited during the month of April at the Avery Library of Columbia University, and was studied by many persons interested in them. During the exhibit, Mr. Bird delivered a lecture relative to these water colors to students of the University.

Dr. P. A. Rydberg, of the Garden staff, recently spent two weeks at the Gray Herbarium and the Arnold Arboretum, Cambridge, Mass., pursuing his studies of *Rosa*, *Psoralea* and related genera, and certain composites for North American Flora.

Mr. S. F. Blake, of the Bureau of Plant Industry, Washington, D. C., spent several days at the Garden recently, studying the family Polygalaceae, which he is monographing for North American Flora.

Mr. Henry G. Parsons, supervisor of gardening instruction, outlined the work being done by the Garden School in an address at the Municipal Building, New York City, on April 15.

The middle of April gave promise of coming delights in the Japanese cherry collection, bringing bloom on the trees of *Prunus Sargentii*, Sargent's cherry; *P subhirtella*, the rose-bud cherry; *P. pendula*, the weeping rose-flower cherry, all natives of Japan, and showing masses of pink flowers before our named Japanese varieties bloom.

Magnolia stellata, a small, white-flowered Japanese species known as Hall's magnolia, was the first kind to bloom in the magnolia collection, followed by the very fragrant Thurber's magnolia *M. Kobus*, of which there are several fine specimens in the Fruticetum.

Meteorology for March.—The total precipitation for the month was 1.12 inches. Maximum temperatures recorded for each

week were 59° on the 6th, 64° on the 17th, and *69° on the 19th and 31st.* The minimum temperatures were 18° on the 4th, *16° on the 11th*, 26° on the 24th, and 21° on the 26th. The ice in the lakes east of the museum building disappeared on the 22d.

SUMMER LECTURES, 1918

Free Public Lectures will be delivered in the Lecture Hall of the Museum Building of the Garden, Bronx Park, Saturday afternoons, at four o'clock, as follows:

June 15. "Rose Gardens," with visit to new Rose Garden, by Mr. G. V. Nash.

(Exhibition of roses and peonies, June 15 and 16.)

June 22. "Economic Uses and Possibilities of the Seaweeds," by Dr. M. A. Howe.

June 29. "Wild Flowers of Summer," by Dr. N. L. Britton.

July 6. "Scenic and Botanic Features of the Dells of the Wisconsin River," by Dr. A. B. Stout.

July 13. "How the Introduction of Foreign Plant Diseases is Prevented," by Mr. H. B. Shaw.

July 20. "The Economic Uses of the Fungi," by Dr. Fred. J. Seaver.

July 27. "Edible Wild Plants of the Vicinity of New York," by Dr. H. H. Rusby.

Aug. 3. "Rock and Alpine Gardens," by Dr. E. B. Southwick.

Aug. 10. "The Sphagnum Moss and its Use in Surgical Dressings," by Dr. G. E. Nichols.

Aug. 17. "Through the Eastern Andes of Colombia," by Dr. F W. Pennell.

Aug. 24. "Ancient and Modern Ideas in Regard to Fossil Plants," by Dr. Arthur Hollick.

(Exhibition of gladioli, Aug. 24 and 25.)

The lectures, which occupy an hour, will be illustrated by lantern slides and otherwise. Doors closed at 4:00; late comers admitted at 4:15.

The Museum Building is reached by the Harlem Division of the New York Central and Hudson River Railroad to Botanical Garden station, by trolley cars to Bedford Park, or by the Third Avenue Elevated Railway to Botanical Garden, Bronx Park. Visitors coming by the Subway change to the Elevated Railway at 149th Street and Third Avenue. Those coming by the New York, Westchester and Boston Railway change at 180th Street for crosstown trolley, transferring north at Third Avenue.

ACCESSIONS

PLANTS AND SEEDS

73 plants for nurseries. (By exchange with Bureau of Plant Industry, U. S. Dept. of Agriculture.)

1 plant, *Coryphantha durangensis*, for conservatories. (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

5 plants, *Mamillaria* sp. for conservatories. (By exchange with Desert Botanical Laboratory.)

5 plants, *Galax aphylla*, for American wood garden. (Given by Miss Minnie Warren.)

2 plants for conservatories. (Collected by Dr. R. A. Harper.)

48 plants for herbaceous collections. (Purchased.)

14 packets of California seeds. (Given by Mr. W. W. Kent.)

11 packets of Colombia seeds. (Collected by Dr. F. W. Pennell.)

1 packet of seeds of *Acer macrophyllum*. (Given by Mr. F. S. Whitman.)

145 packets of seeds. (By exchange with Brooklyn Botanic Garden.)

1 packet of seeds of *Betula Hallii*. (By exchange with Bureau of Plant Industry, U. S. Dept. of Agriculture.)

1 packet of seeds. (By exchange with the Ministry of Agriculture, Giza, Egypt.)

362 packets of seeds. (Purchased.)

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JOURNAL

OF

The New York Botanical Garden

EDITOR

FRANCIS W. PENNELL

Associate Curator

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In the Central Cordillera. Beyond the town of Murillo is seen the snow-covered Paramo de Ruiz.

The Falls of Tequendama. The Rio Bogotá drops about 450 feet into a rock-walled cañon.

JOURNAL

OF

The New York Botanical Garden

VOL. XIX June, 1918 No. 222

A BOTANICAL EXPEDITION TO COLOMBIA

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF,

Sir : With your permission, in the summer of 1917 I joined Dr. H. H. Rusby in a botanical expedition to Colombia, South America. The purpose of this expedition was primarily the investigation of certain medicinal plants, secondarily the collection of specimens for our institution. In the latter project we were most successful, and the 4,700 numbers brought back, obtained from lowland plains and from cordilleras, are a valuable addition to our herbarium.

I. WITH DR. H. H. RUSBY

Professor Rusby and myself left New York, June 26, 1917, and after a voyage under continuously pleasant weather reached Cartagena the sixth of July. We stopped at two points en route. I received my first glimpse of tropical vegetation, unless that of southern Florida be counted as such, at the Botanical Garden of Kingston, Jamaica. However, much more interesting was the wild vegetation seen during an afternoon's drive near Colon in the Canal Zone. Here palms, Melastomaceae, Heliconias and Aroids grow in native luxuriance. The morning of July 5 I visited Panama, and Ancon Hill I shall remember, not alone for the beautiful view from its summit, but also, be it confessed, because of an interesting *Buchnera* found there.

We were but one afternoon, and that rainy, in the historic city of Cartagena. Little botanizing was then attempted, excepting that, following my interest in Scrophulariaceae, I

noted the occurrence of the two South Florida small-flowered genera, *Capraria* and *Scoparia*. These occur throughout the open lowland of Colombia.

We made our actual entry into Colombia the following day, July 7. From Puerto Colombia, where we left the United Fruit Company's steamer, we crossed by a little railroad to Barranquilla on the lower Magdalena. From there several competing lines of steamers carry one up that river. Most rapid is the boat connection called the "Expreso," by which the whole trip to Bogota can be made in one week's time. We took this, by steamboat and by train, as far as Girardot.

For five days we were aboard our first river-steamer, the "Medellin." This was an open boat, with a large wheel at the rear, and drawing but three or four feet of water. On the sides we carried two barges, in order to convey the great quantity of wood required for fuel. Even with so much space our stops to replenish the supply were almost daily. As these stops were always in the forest, and as it required some time for the boatmen to carry on the amount needed or obtainable, I found these good opportunities for collecting. More advantage of this was taken when, in January, I returned upon the more leisurely "intermediate" boats.

The lower course of the Magdalena River is through an open plain. However, the river-shore, especially where alluvial, is lined with trees. Of this plain, used for grazing and in which we could not then stop, more account will be given later.

Slightly above Magangue we entered the forest which extends to about La Dorada. In this lowland forest few collections were made, the most being several hundred from near Puerto Berrio, the river-port from which a railroad runs west to Medellin. This forest is typical of that of the lowland of northern Colombia. In all features it resembles that studied later on the Rio Sinu. The Magdalena for many miles is fringed by stellate-leaved cecropia-trees, beneath which is a dense banana-like growth of *Heliconia*, the "wild platano" of the natives. The red and yellow of the inflorescence of this stands out sharply. Behind the cecropias are taller trees of many sorts, the balsa

woods, *Ochroma*, with somewhat similar but darker foliage, being prominent. There are many climbing vines, but few epiphytes and these high and inaccessible.

From the coast to the change in vegetation about La Dorada the negro predominates. To me a source of interest were the little villages through the forest; at a long distance each recognizable by its group of cocoanut palms, near at hand each with its platano-patches, its open thatched huts, and its crowd of naked brown-skinned children—altogether a culture distinctly African. Above La Dorada and Honda the negro is rarely seen, the whites of Spanish descent predominate, or else, more especially toward Neiva, these mixed with Indian blood.

At La Dorada our boat-journey was broken to take the railroad to Beltran, just below Ambalema. This line was built primarily to carry traffic past the rapids of Honda, but it now runs much beyond these. At Honda we turned westward about fifteen miles to Mariquita, thence southward across the open grassy plain of Tolima. The upper valley of the Magdalena is decidedly arid and erosion has produced topographical effects like those of eastern Colorado.

As we rode up near the river toward Honda, and as we went on to Mariquita, through a beautiful clear morning of July, we saw before us, and seeming but a little journey away, the sharp peak of the Nevado of Tolima. How clearly we could trace the limit of snow on its slope! North of it, but less seen, was the really nearer snow-dome of Ruiz. Now that I have mentioned these summits, a word in explanation of the mountain-system of Colombia. As I was later upon all three Cordilleras this is necessary.

In the far southwest the high Andes of Equador enter and continue northward, trending slightly eastward, finally to sink in the Department (or state) of Antioquia. The last high peaks, the first seen as we would enter, are these of the Quindio—Tolima and Ruiz. In December I was upon Ruiz. In southern Colombia two branches issue from either side of this Cordillera Central and continue northward paralleling it, but leaving between each range a narrow river valley. The Cordillera Occidental,

which is separated by the valley of the Cauca River, is mostly a lower chain, but at three portions of its course rises to above timber-line. In February, 1918, I was upon the northernmost of these areas. The Cordillera Oriental, separated by the valley of the Magdalena, is the longest range of the three. Its southern, therefore connecting, portion does not rise to timber-line, but northward are large areas of paramo (as land above timber-line, is known) and on a few peaks some snow. This range falls northward into the lower chain of the Sierra Negra, separated by the tropical Valley of Upar from the wholly isolated snow mountains of Santa Marta, but before so falling it sends to the eastward a spur which rises again to snow peaks in the Sierra de Merida of Venezuela. Two crossings were made of the Cordillera Oriental, in July opposite Neiva, in August opposite Bogotá. On our course up the Magdalena, we saw first—far away eastward and requiring Dr. Rusby's excellent field-glasses—the snow-peaks of Santa Marta; then all was lowland; then to the east the nearer highlands of Ocaña, the Cordillera Oriental which bounds the eastern horizon from there southward; then last of all, but soon rising the highest, to the west these peaks of Quindio, and from these southward the truly majestic chain of the Cordillera Central.

Once more we took the river-boat, but this time only for the short journey from Beltran to Girardot. Above the plain of Tolima the hills, here arid and unforested, close in the river course on either side. Here for the first time did we see Cacti conspicuous, and they became more so southward to Neiva. *Opuntia* was common, also an *Echinocactus*. Several tall *Cerei* were more noticeable, one a tree with many thick-angled branches; its height over twenty feet.

Girardot is a considerable town, and is but a little distance below the head of river-navigation. Its growth is recent and dependent upon the fact that from here a railroad ascends to Bogotá. Another, partly constructed, is proceeding westward with the eventual expectation of crossing the Cordillera Central to Palmira and Cali in the Cauca valley. We were in Girardot but three days, then on July 21 took this last line a few hours journal to Espinal.

Erosion figures on the arid plain of Huila, between Natagaima and Neiva.

Palms in the tropical forest near Villavicencio

Above Girardot the river valley widens again to a plain of some thirty miles wide by sixty long. Just above Natagaima there is another river gorge, the hills shutting out the plain, but yet a third time and stretching to beyond Neiva comes plain. All told we were on three isolated areas of xerophytic plain in the Upper Magdalena, those further south the more arid and cactus yielding.

From Espinal on mule-back,* over the primitive trails which replace roads (ours was named "camino real," royal highway!) we journeyed across these plains for ninety miles to Neiva. We had excellent weather but also good collecting, July being the opening month of the summer dry season. On our return in early August the land was much parched. The first day we rode between enclosed fields, large in area, used for grazing, and the road was lined by tree-hedges of "Mata Raton." This name signifies "kill-rat," but of the tree's ability in this line I have not sure information. It is a species of *Robinia*, so a near ally of our locust-tree; its flowers, as profusely borne, are of a beautiful pink, but without odor. The tree is much planted through lowland Colombia.

Most of our ride was over unenclosed prairie. Over great stretches grasses predominate, mostly of thin or wiry sorts. *Andropogon* and *Bouteloua* were familiar genera. Flowering plants were rarely of showy sorts. A species of *Bradburya*, apparently our *B. virginiana*, was as conspicuous as any. *Meibomia*, *Sida*, *Dichromena*, *Polygala*, *Eupatorium*, *Buchnera*, etc., show the affinity of this flora with that of our own southeastern states.

Occasional streams from the not-distant mountains cross the flat plain, their courses marked from far by a fringe of trees. Here grow magnificent clumps of guadea (bamboo), or there are groves of the stately Palma de Vino, known locally as "Palma Real."

*On the first day of this travel occurred a most serious loss, that of the saddle-bag containing our aneroid barometer. On the Magdalena, and from Girardot to Villavicencio, especially about Bogota, we had with us maps giving altitudes. Elsewhere it has been assumed that zonal boundaries occur at approximately the same altitudes, or actually on the Central or Western Cordilleras, because of forest, at slightly greater elevation.

Nearer the hills, where the plain is higher, and in the river gorge above Natagaima, the valleys have sides more abrupt, and in consequence are filled with a distinctive "arroyo" woodland. This is typically the vegetation of the valleys in the neighboring foothills. The "quebrados," as the streams are called which flow through these "arroyos," are mostly seasonal, but when we were in passage had not yet wholly dried. I know few of the characteristic trees—*Ochroma*, Sterculiaceae, and Acacia-like Mimosads, *Inga*, etc.—but the lower growth was more intelligible. Of vines there are many, pink Bignoniads, dainty-flowered yellow Malpighiads, white Sapindaceae, *Cissus*, *Passiflora* and *Aristolochia*. Along the quebrados are *Cassia* (one large sort with yellow bracts a brilliant plant), Acanthads, small-flowered Menthaceae, *Aeschynomene*, *Mikania*, etc. Of Scrophulariaceae are the widespread lowland *Mecardonia procumbens*, and an *Angelonia*, beautiful with racemes of fantastic blue flowers.

From Neiva, the capital of the recently established department of Huila, we crossed the Cordillera Oriental to "Balsillas", the hacienda of Don Ricardo Perdomo. This is reached by a private camino, for us a three days' journey. We were on this trip in all ten days, from July 30 to August 8.

The foothills rise abruptly from the plain, and, except for the valleys, are open and grass-covered up to nearly 1,500 meters elevation. The vegetation is of tropical genera, largely the same as in the plain. But, as is the case in *Buchnera*, there are usually other species. I recall semi-shrubby Eupatorieae, *Crotalaria*, *Galactia*, *Parsonsia*, *Aeschynomene*, Malvaceae, etc.

Above this altitude the slopes are wooded and here I made my first acquaintance with the most interesting and wonderful of forests, that of the Subtropical* zone of tropical mountains. Here, the air is cooler, rainfall is ample but well-distributed and plants enjoy a maximum development. This is the zone of epiphytes—orchids, Bromeliads and ferns; of other ferns in great variety, the delicate tree-ferns being surely the most

* I follow the nomenclature of life-zones presented by Dr. F. M. Chapman, in his "Distribution of Bird Life in Colombia", Bull. Amer. Mus. Nat. Hist., 36: 84 169, 1917.

graceful of plants; of Gesneriads of many kinds; of long-tubed *Thibaudia* and other Vaccinaceae; of high-climbing *Oxalis* and the gorgeous vine *Bomarea*. Here I saw my first *Fagelia* (or *Calceolaria*), and also the curious Scrophulariacea *Leucocarpus*. I later came to think the Colombian species of *Quercus* most characteristic of this zone, and one of these we saw here. Especially on the eastern slopes are several species of *Cinchona*. Much moss occurs; and on other mountains, which because of local conditions the fog clouds steadily cover, the bloom is much less, a growth of moss and ferns covering deeply the ground and all tree-limbs. The crest of the Cordillera here is under 2,500 meters altitude, so we encountered this forest to the summit.

"Balsillas" proved to be an estate of several square miles cleared from the forest on the upper course of the Rio Balsillas. On several maps this stream is indicated as flowing southward into the Amazonian system, but where we saw it it was flowing northeastward and we were assured that its waters would eventually reach the Orinoco. "Balsillas" is at an altitude of only 2,061 meters, yet has a median temperature as low as 12° C. (55° F.). In passing I may say that here we saw the finest stock seen in Colombia, and that strangely enough the chief pasturage, and that carefully imported, was our common bitter-dock, *Rumex obtusifolius*.

One expedition from "Balsillas" was particularly successful. This was to a natural opening in the forest, a veritable sphagnum-bog, the moss as deep as ever with us in the temperate zone. On the bog were terrestrial orchids (probably *Epidendrum*), *Monnina*, *Begonia*, *Berberis*, *Juncus*, Eriocaulaceae, *Tofieldia* (?), and a curious *Castilleja*. We have from it a large collection of specimens as indeed from the whole of the "Balsillas" trip. Ours is the first botanical expedition which has crossed the Cordillera here.

A ride from Neiva down the Magdalena by "balsa" was a most enjoyable experience. Our raft, made of light balsa-wood, had the luxury of a raised platform of bamboo, and within, under an arch of banana leaves, all was cool and pleasant. It takes little

steering for a balsa; you turn from side to side and have in varying succession all views of the river and shore. Moreover, we returned to Girardot in three days, saving four days' time over our next trip up.

From Girardot a day's train-ride takes one to Bogotá, a climb to over 2,600 meters. You enter the foothills, ascend a valley, and as you rise there is evidence of increasing moisture till you find its climax in the forest zone. But once in the foothills all land near the railroad is so occupied by cultivation that domestic plants might better be used to mark zonal changes. At a little over 2,600 meters we wound around a mountainside, its westward slope wooded, and suddenly saw before us the broad flat floor of the Sabana of Bogotá. It is nearly 28 miles across this on the most level of tracks, and by sunset of the 14th of August we were in Bogotá.

After less than a week in Bogotá, during which time he accomplished much, arranging for further work for both of us, etc., on August 20 Dr. Rusby left. Of his expedition to Medellin and his return to New York you know. Before he left I had made one short excursion to the shrub-covered mountain-slope immediately above the city, and these plants which geographically belong to my Second Collection of specimens, mark the terminus of Collection I. Collection I, the joint work of Dr. Rusby and myself, embraces numbers 1 to 1,316.

II. To Villavicencio, and about Bogotá

On August 22, the day following Dr. Rusby's departure, I left Bogotá to proceed over the Cordillera Oriental and down to the town of Villavicencio, at the head of the plains of the Orinoco. The route followed was again a trail, but although in mountainous country this, being the highway between the capital and the eastern plains, was kept in better condition than those toward Neiva. Of course the journey was made by means of pack-mules or horses. In each direction five days were consumed.

The summit of the Cordillera was crossed within a few hours, that at a point not greatly above the elevation of Bogotá, and so still in the shrub zone (Temperate Zone) below the paramo.

At the time of crossing the wind, as always when I have been on this divide, was strongly from the east, and on it was driving the coldest of rains.

The road-like camino descends through Chipaque to Caquezá, thence eastward its course is cut on the face of steep mountain-slopes above the Rio Negro. These slopes are high; the river is a roaring rocky torrent far below you, and by reason of the quantity of dark loam carried well deserves its name of "black." Only toward Villavicencio does the trail leave the Rio Negro to climb over the last easterly ridge of the Andes.

The winds seem to bring to the eastern Orinocan slope a warmer climate than that of corresponding altitudes of the Magdalena drainage. So we had not far to descend to be below the shrubs and stunted forest of the Temperate Zone. One should have passed into a zone of Subtropical forest; perhaps such at one time existed, but now I found no trace of it near the camino. Everywhere the slopes are under cultivation, even where it would seem impossible from steepness to till the soil. This is the primitive land of maize, and here, in huts beside their little fields, live the Chibcha Indians. I was surprized to find maize planted so high upon the Cordillera, the fields of this pushing well up onto the shrub-lands.

As upon the Magdalena slope, but here extending to a higher altitude, likely to about 2,000 meters, is encountered next a zone of open grassy slopes. Cornfields, and practically all sign of cultivation or settled life, disappear. What induces open land upon this side of the cordillera can hardly be aridity. The soil did not seem especially thin, nor of a poor quality. Deep valleys of streams were wooded. These mountain-slopes were surmounted by what must evidently have been Subtropical forest, but this was so far above the trail that I could reach it at but one point.

The flora of these slopes delighted me. Most conspicuous was a large deep-pink terrestrial orchid—its flowers like a *Cattleya*—which in large colonies overhung the camino. With it were other pink and white orchids. *Crotolaria*, *Lobelia*, scarlet *Scutellaria*, *Meibomia*, *Centropogon*, *Hyptis*, *Eryngium*, *Rubus*, *Com-*

melinaceae, *Lantana* is a list which, excepting *Rubus*, shows the flora to be essentially tropical. Of *Scrophulariaceae* were two species of *Fagelia*, a semi-shrubby *Castilleja* and the large-flowered white *Escobedia*. Strangely enough, neither here nor in the Orinoco plains was any *Buchnera* found.

Eastward from these open slopes, but of the same altitude, is the forest, this continuous with that of the Orinoco plains and also evidently on some mountains with that of the Subtropical Zone above. It is rich and interesting, and I should presume presents a greater variety of species than does that of the Magdalena. Essentially lowland it showed only a secondary growth of epiphytes, and lianas were in great abundance. As ever in the lowland forest I was able to make but few collections of trees.

Some trees both of this and the forest about Villavicencio are noteworthy. One is a brilliant red-bracted Rubiacea. Others of this family bear in profusion blue or white flowers. Of the last is the quinine-yielding *Remigia*. There is another tree, which grows in the streets of Villavicencio, its branches loaded with a heavy white inflorescence. I broke a twig and found my hand under inspection by numbers of large ants streaming out from the twig's hollow interior. The onlookers were right in applying to this tree that expressive Spanish word—applicable to such cases or to the rigors of the paramo—"bravo." Later on the Magdalena slope I recall another species, but with red inflorescence.

Villavicencio is a small town, although the largest yet settled in the major area of Colombia, the land east of the Andes. It is the capital of the "Intendencia" of the Meta. About it, and connecting southward and southeastward I believe with the Orinoco-Amazon land, is forest. To the account of that just described, if you make changes in the component species, add more trees of first magnitude, and more palms, also show its stretches flat and muddy (beloved of *Micranthemum* and like herbs) you have it as I saw it. The Rio Guatiquia enters the plain but a mile north of Villavicencio, and along its entering ravine and on the open gravel playas, were found several smaller Scrophulariaceae.

From the last ridge above Villavicencio I had enjoyed a wide view of the plain stretching eastward. Mostly this was dark green with forest, but two light yellow bands crossed it and widened northward. These were the "llanos," open grassy plains, a prolongation southward, if I understand it correctly, of the great llanos of Casanare. The nearest area was only two to three hours from Villavicencio, and to that, in spite of the deep mud of the trail, two one-day trips were made.

Oh, to have botanized more extensively on these llanos! The flora is of eastern type, as was that of the upper Magdalena plain, but here it is not xerophytic and is far richer. The level rolling prairie is covered with grasses, again with *Andropogon* a predominant element. With these grow *Polygala*, *Galactia*, *Rynchospora*, *Borreria*, *Bradburya*, *Chamaecrista*, etc., and most interesting to me a yellow "Gerardioid" Scrophulariacea, I know not what. But in the moist depressions are the botanist's gardens. *Rynchospora*, *Scleria*, *Xyris*, *Eriocaulaceae*, *Mayaca*, *Utricularia*, *Ludwigia*, *Burmannia*, Menthaceae, small Melastomaceae, small-flowered Scrophulariaceae—and you have some impression of its similarity to what we see in southern Georgia and Florida.

I was in Villavicencio eight days, August 27–September 3. The return trip was somewhat deferred because of the earthquake* of August 31. While not severe this had caused many landslides on the trail. The "temblores" proved not to be over even by September 6, for while at Monte Redondo, in the midst of the most precipitous open slopes, we felt decided shocks. But all went well, and I arrived at Bogotá September 8, bearing a rich collection of specimens.

Over two months, until November 28, were spent in and near Bogotá, never leaving the department of Cundinamarca. All of this period I was in the upland of the Cordillera Oriental. Many short trips were taken to points near Bogotá, and longer excursions to the northern and southern extremities of the Sabana.

* Serious damage from this was almost confined to the churches, mostly very old structures. In Villavicencio one wall fell in, killing eight worshippers—the most serious loss of life reported in Colombia. The seismatic disturbance is thought to have originated in the Quindio, in the extinct volcano of Ruiz, a mountain which later I climbed.

October 20–24 I was at Zipaquirá, collecting westward to the paramo of El Chuscal, and northeastward at Nemacon. On two occasions, October 13–15 and October 28–29, I was at Sibate, collecting southward and westward to El Peñon; also on two dates, September 15 and October 28, at the Falls of Tequendama. Of these localities I shall give no individual accounts. At Tequendama and a few miles south and west of Sibate I was in Subtropical forest, elsewhere, whether at Bogotá or Zipaquirá, the ascent was made from the sabana-floor to paramo.

The Sabana of Bogotá is flat, apparently a former lake bed, now drained through the gorge of Tequendama. Other like areas occur northward in the Cordillera, some, as that of Fuquene, occupied by considerable lakes. I suppose the flora of the others must be much as that of Bogotá. As this is now solidly under cultivation and much of it has been so since before the conquest we cannot speak with precision of the vegetation. Certain plants are found about the margin and on waste places in it. Among these are *Alnus*, *Salix*, *Carex*, *Juncus*, *Marsilia*, Apiaceae, *Oenothera*, *Gratiola*, and most common *Nierembergia* and the inconspicuous greenish-flowered *Dichondra*. Perhaps *Alonsoa meridionalis* belongs here, as I have never seen it in seemingly native habitats nor much above this level.

From the sides of the sabana and extending as peninsulas into it, rise hills which are covered with a grayish coat of shrubby vegetation. This zone extends from the basal 2,600 meters* to about 3,100 meters altitude. The bushes are intricate, but seldom thorny. I recall species of *Cestrum*, *Centropogon* or allies, various Vacciniaceae and Melastomaceae. *Hypericum* is abundant, some species semi-shrubby. Our first "Frailejon," *Espeletia*, this with brittle narrow yellowish leaves, is here. Also *Geranium*, *Valeriana*, *Lycopodium*, *Cerastium*, *Iridaceae*, *Eriocaulon*, *Lupinus*, etc. Toward its upper limit grows *Aragoa cupressina*, a coniferous-looking, white-blossomed Scrophulariaceous shrub. Abundant in this zone is a low red-bracted *Castilleja*, while another of this genus with yellow bracts, and likewise undescribed, is

* This zonal boundary is lowered by reason of the sabana. Beyond Sibate, where the clouds rise from the Magdalena forest, it is at about 2,800 meters altitude.

occasional. At a few places is the beautiful pink *Lamourouxia serratifolia*, one of the handsomest of Scrophulariaceae. Here our garden *Digitalis* has escaped and become the most conspicuous wild plant.

As ever the valleys of this zone, *e. g.*, the "Boqueron," support a more luxuriant growth. Trees or shrubs of temperate genera, *Padus*, *Crataegus*, etc., are seen, with arborescent Solanaceae and tree-ferns. Here is found the largest species of *Castilleja*, the type of the genus, *C. fissifolia*, robust plants of which reach six feet in height. Peculiar species of *Bartsia* and *Fagelia* grow in these "cañadas."

But it is above timber-line, which I would here place at about 3,100 meters altitude, that we have one of the most remarkable zones of Andine vegetation. This is the Paramo. The growth is low, predominantly of grass and sedges. In Cundinamarca, depending upon moisture, the paramo occurs in two phases.

The peaks which rise from the sabana-margin, as do Guadalupe and Monserrate above Bogotá, have but the drier phase; this follows all the ridges and forms the greater portion of the paramos. In places the soil is thin and this flora is then very meager. Clumps of a *Tofieldia*(?), dwarf Vacciniaceae, *Gentiana*, *Sisyrinchium*, *Xyris*, *Geranium*, *Alchemilla*, *Lobelia* might be mentioned. Interesting are several species of *Bartsia*, the most common having yellow flowers.

The moister phase is found on the higher and flatter paramos, of which Cruz Verde and Choachi are both within a few hours of Bogotá. I was upon other such above Zipaquirá and on El Chuscal. On all these occurs a great growth of sphagnum, sometimes surrounding small lakes, and with this moss a peculiar flora. Here grows the most impressive plant of the paramo, the large Frailejon, *Espeletia grandiflora*. This has a stout cycad-like stem, sometimes but two feet, sometimes eight feet tall, at the summit of which are clustered the pale-green silky aromatic leaves and the cymes of yellow flower-heads. From the leaves an incense is prepared. Where wetter are gnarled Composite shrubs, and also another species of *Aragoa*. Other Scrophulariaceae include several species of *Bartsia*, one of which, in all dimen-

sions the largest of that genus seen, forms beautiful masses of pink. An attractive fine-leaved *Castilleja* will also prove new to science.

In steep valleys within the paramo grows a sheltered forest rich with epiphytic mosses and ferns. Here hanging *Usnea*, and the scale-lichens which cover the gnarled branches, give, in spite of the mossy load of air-growth, a predominant somber-gray. This is relieved by some bloom, the most brilliant flowers being the clusters of a *Loranthus*. The tube-like scarlet blossoms of this measure six inches in length. But such a forest is properly considered but an island of the "cloud-zone," and to this I was soon to descend upon my departure from Bogotá.

My Collection II, made upon the trip to Villavicencio and during the stay in Bogotá, includes numbers 1317 to 2689. These specimens were sent to New York in November, 1917.

III. To Pandi and the Ascent to Ruiz

On November 28 the start was made from Bogotá to proceed to Girardot, *via* Fusagasugá and Pandi. This was the route taken by Baron von Humboldt over a century ago and many of his species must have been re-collected.

A railroad runs out to Sibate, about 28 miles from Bogotá. There I obtained horses and proceeded to Fusagasugá. Although this is the favorite summer resort of the upper classes of Bogotá, it must still be reached by trail.* On previous visits to Sibate collections had been obtained in the margin of the Subtropical cloud-forest, and now a descent was made directly through this. In ascending the same cordillera opposite Neiva some account of this zone was given. For the Fusagasugá transit I will only mention having obtained a brilliant scarlet *Begonia*, its large flowers making it the finest seen of this genus; and also will note the abundance of tree-ferns.

From Fusagasugá to Pandi, and on to Icononzo and Melgar (except for a short forest on the ridge between the last two) the way leads through the open grassy lower mountain slopes. My

* A road is in process of construction.

journey was as primitive as must have been that of Humboldt. As did the Baron, I stopped to see the Natural Bridges of Pandi. These form rock-crossings about 300 feet high above the narrow gorge of the Rio Sumapaz. The second of these is hid in the forest, indeed is covered by it. Forest fills this as it does other "quebrado"-valleys. Special trophies of this trip were several species of *Buchnera*, likely the ones credited in Humboldt's reports as questionably from the Sabana of Bogotá.

Nor need more be said of the plain about Melgar. An outlying low range hides it from that of the Magdalena above Girardot, to which in all respects it is like, excepting that I seem to have more memory of seeing here xerophytic Acacia-like trees.

At Girardot, December 6, I met Sr. Carlos Mallarino, and with him proceeded to San Lorenzo and to the large hacienda near Libano, which he with Sr. Vega, his partner in the coffee business, operates. This is in the foothills of the Cordillera Central. Until nearly the close of the year I enjoyed the hospitality of "La Trinidad," and from there an excursion was made to the snow of Ruiz.

A cross-section from base to summit of the Magdalena slope of the Cordillera Central shows a most interesting homology with the facing western slope of the Cordillera Oriental. The vegetation of the plain of Tolima has already been mentioned. My fullest collections from this were obtained early in January near Mariquita, the town where Mutis spent seven years.

Upon the foothills of the Central there is a lowland xerophytic forest. Indeed at this altitude whether open or forest predominates depends upon local climatic conditions. Although many species are the same as those across the Magdalena, there was in this zone, in the forest, much not before seen. These are all of tropical genera and mostly unfamiliar to me. This lower forest belt has been much cleared to make plantations for coffee.

An hour's steep climbing from Libano along the broad trail toward Manizales brings you to the summit of a spur from the Cordillera. About where this is reached the Subtropical forest is entered. The town of Murillo is about the center of this zone. Again a species of *Quercus* is the predominant tree. Again, as

on the slopes of the Oriental, are species, but usually differing, of *Bomarea*, *Thibaudia*, *Fuchsia*, *Begonia*, *Viola*, Mutisiaceae, epiphytic orchids and ferns, etc. While the term "cloud-forest" is appropriate here, it is just as applicable to the zone above.

At higher altitudes the trees are lower and more branched, these branches laden with moss and ferns, the bark lichen-gray—all features recalling the high forest seen on El Chuscal. Like that, this belongs to the so-called Temperate zone. Cold are the nights; I recall one morning of hoar-frost when there was ice nearly 2 mm. thick. To me it was a surprise to find after this the vegetation quite unhurt. Much was then in blossom.

Few shrubs can be more brilliant than a species of *Berberis*, its branches loaded with large golden-yellow flowers. *Mutisia*, other species of *Thibaudia*, *Fuchsia*, *Fagelia*, and *Castilleja* are ornamental. I cannot stay to mention more, but would em phasize the fact that as we ascend the Cordillera Central we find less and less species the same as those of corresponding altitudes on the Cordillera Oriental.

So when we stand upon the open paramo we see little that we have seen above Bogotá. Yet the general effect is almost precisely the same. The same great stretches of open thin grass, in the sphagnum swales the same gnarled growth of Composite shrubs, and over large areas similar groves of massive frailejones. Many of the same genera meet us, but as in *Espeletia* with different species. In the Scrophulariaceae *Bartsia* boasts several sorts, but these all new to us. There is a certain small number of species, of *Antennaria*, *Gentiana*, *Alchemilla*, etc., apparently the same on both cordilleras (and also seen later on the Occidental), but careful study may show some of these supposed identities to be actually allied forms. Many genera were seen for the first time on this paramo. A most abundant plant is a little spreading Menthacea, *Micromeria nubigena;* also, rivalling the frailejon in impressiveness, is a thick-stemmed *Lupinus*, its leaves and inflorescences seeming outbursts from near the summit of the white-wooly plant column.

But only on the Paramo de Ruiz did I reach snow, and this brings us to the floral belt which might be termed the "ultra-

paramo." In our own western mountains there is a summer season, and luxuriant vegetation follows closely upon each retreating snowdrift. In Colombia the temperature is practically uniform the year round. The lower paramo, never knowing a summer, does not show the luxuriance of that of our Rockies. If this be so, what must be the condition of the upper paramo? Gradually as we ascend sparser and smaller is the growth; the large frailejon disappears, to be replaced by an ally with the densest coat of silky white hairs that I have ever seen on a plant. But vegetation of this and of all plants becomes dwarfed and scattered until finally, before snow is reached, there is little left on the bare earth beyond some lichens. One species of *Bartsia* is peculiar to this "ultra-paramo," and highest of all flowering-plants grow two Cruciferous species—in December laden with bloom—one a mass of white, the other of golden-yellow.

Another consequence of an equable temperature is that, once you are above the line of freezing, snow forever accumulates. I reached snow upon a "loma" or spur, and my guide took me to a point from which across an alpine valley almost devoid of vegetation we should have seen the main dome of the mountain. We waited long, hoping the driving mist would break; at last it did so, but only partially and for a moment. It is now one of my main regrets that I did not rise early enough to reach this in the hour between sunrise and the creeping up of the clouds from the valleys. For the imperfect glimpse I obtained was of ice-precipices and -pinnacles, the lower edge of the glacier which, as a solid cap of ice, covers the summit of Ruiz.

After returning from Libano to San Lorenzo I proceeded to Honda, thence, during early January, by boat, collecting at wood-loading and other stations, to Magangue. The plants obtained since leaving Bogotá are my Collection III, numbers 2690 to 3964, and were sent, January 22, 1918, on to Barranquilla, to await my later arrival at that port.

IV. The Rio Sinu and the Cordillera Occidental

In accord with instructions sent me from New York I was to proceed to the forests of the Rio Sinu. This river drains a

considerable valley lying in the Department of Bolívar, between the lower Magdalena and the Rio Atrato. The river rises in the last northern highlands of the Cordillera Occidental. It flows northeastward, receiving from the west streams from the Cerro de Palomas and other ranges of hills, from the east from the higher forested mountains, the Cerro de Murucucu. But to follow our narrative let us return to Magangue upon the Magdalena.

From Magangue, on the evening of January 23, I set out by mule to cross the Sabana of Bolívar to Monteria on the Sinu The first evening's ride, under a full moon, cannot be forgotten. I soon left the alluvial soil of the Magdalena, utilized for extensive pastures, and traveled over a scarcely higher slightly rolling loam plain. Here and there gravel ridges cross it. I rode through a low scrub-like forest, but in which even in the half-obscurity some trees in blossom showed. One was a large-flowered golden-yellow Caesalpineaceous tree. But most magnificent of all were trees of "Caracoli" (*Anacardium*) and the various species termed "Ceiba." One of the latter has a heavy trunk with enormous plate-like buttresses, these as high as the head of the rider on horseback. Another has a brownish trunk, this ringed at about ten foot intervals, suggesting in aspect terra-cotta pipe of very large bole. It bears at the summit a disproportionately small crown.

But some of these details I saw during the daylight journeys of the week spent in crossing to Monteria. The second day's journey was through forest, with occasional areas of open. There were growths of *Aristida, Andropogon* or like grasses, but all now dried. I was disappointed to find, contrary to what I had been led to expect, that the dry season was already much advanced. These small areas of open I took to be but a foretaste of the real sabanas of Bolívar; however their flora was to prove the best representation I obtained of that "natural" geographical area.

Unexpectedly to me, as I penetrated inland from Magangue, following a highway used only by pack-animals, I came to more and more of civilization. Town after town, each electric-lighted, relatively clean and attractive, are here, the finest of all being

Sincelejo. The broad trail runs between enormous areas of pasture, a land kept green by the drought-resistant guinea and para-grasses. So solidly are these grown that once in the primitive open there appears to be no native flora left. The trail, as are the fences, is lined by endless rows of "Mata-Raton" (*Robinia maculata*) and these trees, then in full blossom, lent a delicate flush to the landscape, appearing—in habit too—like rows of overgrown peach trees.

The areas of forest, irregularly scattered across the sabana, yield in January considerable blossom and much fruit. Its herbaceous flora was already much dried, being reduced to *Sida*, and like drought-resisters. Of vines, I recall Bignoniads, Malpighiads, *Passiflora*, and here made bitter acquaintance with *Mucuna*. The large pods of the last, a Papilionacea, are covered with a brown velvet of stinging hairs. The vegetation of this forest must be both flood and drought resistant. In the Sabana of Bolívar and through the lower Sinu valley the year is divided into two seasons, wet, becoming very wet, from May to November, dry, becoming very dry, from December to April.

Mr. L. C. Sliger, of Monteria, for thirty years in charge of American lumber interests in this section, assures me that the entire lower valley of the Rio Sinu was once forested. Considering the small population there it is amazing that deforestation on such a scale should ever have been carried on. For now the Sinu valley, from the forest near tidewater around Cispata Bay, to the base of the hills about Tierra Alta or toward the Murucucu, is a great open land, like the sabana green with drought-resistant planted grasses. Occasional trees of "Caracoli" and "Ceiba" are left, and above Monteria occasional strips of forest along the bank. Otherwise this plain is the poorest botanizing land imaginable.

Exception must be made of certain low hills which about Lorica and Monteria rise as islands above the plain. These are wooded with the peculiar forest above noted. The xerophytism of this is most pronounced. When I last saw it during March, after three rainless months, the trees had mostly shed their leaves. Indeed its distant aspect, the leafless trees, the usually lower

broad-leaved evergreens, and certain trees covered with small red flowers, reproduced with striking fidelity our native woodlands in spring, with an undergrowth of *Kalmia* and with red maple in blossom.

On February 2, I left Monteria to ascend the Rio Sinu and its tributary the Rio Esmeralda to a point labeled on a map with me Puerto Canoa. thence to follow a trail indicated to the summit of the Cordillera Occidental. This would accomplish the ascent of the third Cordillera of the Andes in Colombia, and would yield a valuable comparison of the altitudinal zonation of plant-life on each. The trip appeared quite feasible, and I was told it would probably consume twenty days. It required thirty-nine, and proved a more difficult project than had been anticipated. However, I believe that it is the first botanical expedition to the upper Sinu river or to this northern highland of the Cordillera Occidental.

Throughout the river-journey canoes are the sole possibility of travel. These are hollowed from trees, and quite heavy. They are propelled against the current by poling. About mid-way to the mountains is Tierra Alta, the only town—that really but a village—above Monteria. A little above this you enter the forest and only occasional are small clearings. Soon you are among hills and the river-current becomes stronger, consequently travel slower. This lowland forest is much as that noted on the Magdalena and I believe with but slight change in the component species. Here, being on a small river, I could see it more intimately.

In the wet season the Sinu is a large river deriving water from a large basin. In the dry season, as in February and March, it is but a small river, practically all its water derived from four streams heading in the higher mountains and soon uniting. The Rio Manso comes from the higher Murucucu to the south-east, the Rio Verde from the fast-falling Cordillera Occidental to the west, the Rio Sinu itself and the Rio Esmeralda from the high Cordillera to the south. The first of these tributaries to be encountered is the Rio Verde, and Boca Verde, the last lowland settlement of whites and where first are seen the aboriginal Choco Indians, is an important stage in this trip.

About Boca Verde and up to the head of navigation on the Esmeralda grows the lowland forest in ever-increasing luxuriance. Epiphytes become an important element of this, and tree limbs over the river are clothed with masses of ferns and bromeliads. Only rarely are orchids seen, although this is the home of fine Cattleyas. Two cacti, *Epiphyllum* and *Rhipsalis*, grow on these limbs.

From Puerto Canoa, where is not even a house, it proved to be not a matter of nine or eighteen miles, as in two directions my map indicated, but a four days' journey to the paramo. This was not over a well-traveled trail, but over the roughest sort of Indian path. Unfortunately I had permitted my ankles to become sun-burned, then injured, and the climb to the Cordillera summit, while made, was a painful and hampered achievement. It is a matter of regret that on this account the exploration in this most important region was somewhat curtailed.

Space does not permit me to give many details of this last mountain-climb. Of the beautiful mountain streams crossed, the waterfall passed, of over 100 feet drop—and of other falls heard through the forest—of Antizales, the one outlying village passed, settled from across the Cordillera, I can scarcely make mention. I must call attention to the fact that this part of Colombia needs to be mapped, the current charts for it being very erroneous.

Nor must I speak much of the different zones of vegetation passed in our ascent. These are in general homologous with those of the Cordilleras Oriental and Central. The Subtropical cloud-forest seems even wetter, and I missed much that I had expected to see. It is probably too moist for *Quercus*, but why *Oxalis* should not be seen I know not. Never, unless near El Peñon, have I seen moss so dense, and ferns are very abundant. Gesneriads grow in profusion, some of them epiphytes.

Rather sharply above this—we were on a "loma"—comes the shrub zone and this lasts to the summit of the Cordillera. The commonest shrub is a little conifer-like *Hedyotis*—the same occurs above Bogotá. *Berberis*, *Thibaudia*, *Gaultheria* and other familiar genera are present. A terrestrial Bromeliad forms by its

crowns the most perfect water-cups I have seen in this family. I must mention the practical use we made of these. The mountain-soil is porous and soon drained—above the cloud-forest it was quite dry and for several days we had no other supply of water than that in these cups.

For a while I feared there would be found no grassland, paramo, on this portion of the range. But such there proved to be. It was very small, here only about five or seven acres, and, as could be seen on nearby peaks, there are many other such little areas. Far to the eastward could be seen a higher mountain called "Paramillo" and to this from the opposite direction the ornithologist Leo Miller, of the American Museum of Natural History, cut his way in 1915. His account of the barrenness of the paramo there agrees with my finding on this minute Paramo de Chaquiro.

Although so small in extent the flora is interesting. *Pernettya*, *Sisyrinchium*, *Espeletia*, *Bomarea*, *Gentiana*, *Befaria*, *Geranium*, *Erigeron*, occur with species apparently the same as those growing on the other Cordilleras, but study may reveal distinctions. Certainly distinct are the two Scrophulariaceae obtained. One is a species of *Bartsia*. The other is an *Aragoa*, a genus I had supposed confined to the remote Cordillera Oriental. But absences are as notable as presences upon this upper Cordillera. That I saw no *Ranunculus*, *Oxalis*, *Castilleja*, *Fagelia* or many more such genera is most surprising.

I left the Paramo de Chaquiro February 24. Of the return trip to Boca Verde, and to Monteria, there of delay in obtaining transportation; of the boat-ride to Cartagena, thence to Barranquilla and to New York, no account need be given. At Cartagena and at the nearby Turbaco, frequent type-stations for Humboldtian species, collections were made. A number of living orchids and of various seeds from the Rio Sinu and western Cordillera were brought to New York, as well as the dried specimens of Collections III and IV.

Collection IV includes numbers 3965 to 4771, from the sabana of Bolívar, the Rio Sinu to the Cordillera, and a few from coastal or near-coastal stations.

FRANCIS. W. PENNELL

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Spiraea cantoniensis. REEVES' SPIRAEA.

Location: Fruticetum.

Natural distribution: China and Japan.

Spiraea cantoniensis var. **lanceata.** REEVES' DOUBLE-FLOWERED SPIRAEA.

Location: Fruticetum. Shrub group near power house 1.

Spiraea chamaedryfolia. CHAMAEDRYS SPIRAEA.

Location: Fruticetum.

Natural distribution: Southeastern Europe to Japan.

Spiraea Douglasii. DOUGLAS' SPIRAEA.

Location: Fruticetum.

Natural distribution: Northwestern North America.

Spiraea Henryi. HENRY'S SPIRAEA.

Location: Fruticetum.

Natural distribution: Central and western China.

Spiraea Henryi var. **notabilis.** HENRY'S LARGE-FLOWERED SPIRAEA.

Location: Fruticetum.

Spiraea hypericifolia var. **chovata.** OBOVATE SPIRAEA.

Location: Fruticetum.

Natural distribution: Southeastern Europe.

Spiraea japonica. JAPANESE SPIRAEA.

Location: Fruticetum.

Natural distribution: Japan and China.

Spiraea japonica var. **atrosanguinea.** DARK-FLOWERED JAPANESE SPIRAEA.

Location: Fruticetum.

Spiraea japonica var. **Fortunei.** FORTUNE'S SPIRAEA.

Location: Fruticetum.

Natural distribution: China.

Spiraea japonica var. **ovalifolia.** OVAL-LEAVED CHINESE SPIRAEA.

Location: Fruticetum.

Natural distribution: Western China.

Spiraea latifolia. BROAD-LEAVED MEADOW-SWEET.
Location: Fruticetum.
Natural distribution: Northern North America.

Spiraea Lenneana. LENNE'S SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea lucida. SHINING SPIRAEA.
Location: Fruticetum.
Natural distribution: Northwestern North America.

Spiraea macrothyrsa. LARGE-CLUSTERED SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea Margaritae. MARGARITE'S SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea Menziesii. MENZIES' SPIRAEA.
Location: Fruticetum.
Natural distribution: Alaska to Oregon.

Spiraea Miyabei var. **glabrata.** MIYABE'S GLABROUS SPIRAEA.
Location: Fruticetum.
Natural distribution: Central China.

Spiraea nipponica. BRACTED SPIRAEA.
Location: Fruticetum.
Natural distribution: Japan.

Spiraea pikowiensis. POLISH SPIRAEA.
Location: Fruticetum.
Natural distribution: Poland.

Spiraea prunifolia var. **plena.** BRIDAL-WREATH SPIRAEA.
Location: Fruticetum. Shrub group west of Museum.
Natural distribution: China and Japan.

Spiraea salicifolia. QUAKER LADY.
Location: Fruticetum.
Natural distribution: Eastern Europe to Japan.

Spiraea Sanssouciana. SANSSOUCI SPIRAEA.
Location: Fruticetum.
Hybrid.

Spiraea Thunbergii. THUNBERG'S SPIRAEA.

Location: Fruticetum. Shrub group west of Museum. Shrub group near 200th Street entrance.

Natural distribution: Japan.

Spiraea tomentosa. STEEPLE-BUSH.

Location: Fruticetum.

Natural distribution: Eastern North America.

Spiraea tomentosa var. **alba.** WHITE STEEPLE-BUSH.

Location: Fruticetum.

Spiraea trilobata. THREE-LOBED SPIRAEA.

Location: Fruticetum.

Natural distribution: Northern China to Siberia.

Spiraea Van Houttei. VAN HOUTTE'S SPIRAEA.

Location: Fruticetum. Shrub group west of Museum.

Hybrid.

Spiraea Veitchii. VEITCH'S SPIRAEA.

Location: Fruticetum.

Natural distribution: Central China.

Spiraea Wilsonii. WILSON'S SPIRAEA.

Location: Fruticetum.

Natural distribution: Central and western China.

Sibiraea. SIBIRAEA

Sibiraea laevigata. SIBIRAEA.

Location: Fruticetum.

Natural distribution: Siberia.

Schizonotus. MOUNTAIN-ASH SPIRAEA

Schizonotus arbcreus var. **glabratus.** GLABROUS LARGE MOUNTAIN-ASH SPIRAEA.

Location: Fruticetum.

Natural distribution: Central and western China.

Schizonotus Lindleyanus. LINDLEY'S MOUNTAIN-ASH SPIRAEA.

Location: Fruticetum.

Natural distribution: Himalayan region and China.

Schizonotus sorbifolius. COMMON MOUNTAIN-ASH SPIRAEA.
Location: Fruticetum.
Natural distribution: Northern Asia.

Schizonotus stellipilus. STAR-HAIRED MOUNTAIN-ASH SPIRAEA.
Location: Fruticetum.
Natural distribution: Northeastern Asia.

Exochorda. PEARL-BUSH

Exochorda Giralda var. **Wilsonii.** WILSON'S PEARL-BUSH.
Location: Fruticetum.
Natural distribution: Central China.

Exochorda Koralkowi. TURKESTAN PEARL-BUSH.
Location: Fruticetum.
Natural distribution: Turkestan.

Exochorda racemosa (*Exochorda grandiflora*). CHINESE PEARL-BUSH.
Location: Fruticetum. Shrub group at approach to Elevated Railway.
Natural distribution: China.

Rhodotypos. WHITE JAPANESE ROSE

Rhodotypos kerrioides. WHITE JAPANESE ROSE.
Location: Fruticetum. Shrub group west of Museum.
Natural distribution: Japan.

Kerria. JAPANESE ROSE

Kerria japonica. JAPANESE ROSE.
Location: Fruticetum.
Natural distribution: Japan.

Kerria japonica var. **flore-pleno.** DOUBLE-FLOWERED JAPANESE ROSE.
Location: Fruticetum.

Neviusia. SNOW WREATH

Neviusia alabamensis. SNOW WREATH.
Location: Fruticetum.
Natural distribution: Alabama.

NOTES, NEWS AND COMMENT

Dr. Mel. T. Cook, of Rutgers College, recently spent a day in the library looking over literature relating to the diseases of plants.

Bulletin number 36, containing the reports of the Director-in-Chief and heads of departments of the Garden was issued April 30, 1918. This number completes volume 9 of this publication.

Mr. W. W. Eggleston, assistant botanist of the Bureau of Plant Industry, spent several days at the Garden during May, engaged in a study of herbarium specimens of plants poisonous to stock.

Dr. Arthur Hollick, honorary curator of fossil plants, represented the Garden at the thirteenth annual meeting of the American Association of Museums held at Springfield, Massachusetts, May 20 to 23.

A number of English sparrows were recently observed to be busily engaged in picking the seeds from the dandelions and apparently eating them. So much evil has been charged to this unwelcome "alien" that it seems no more than right to give it credit for the small amount of good it may do in the destruction of the seed of this troublesome weed.

In the January number of *Phytopathology*, L. M. Massey claims that a dust mixture consisting of 90 parts of sulphur and 10 parts of arsenate of lead is more effective in the control of powdery mildew of roses than a spray of lime-sulphur and is much less unsightly. The mixture acts both as a fungicide and an insecticide and is easier to handle than the pure sulphur dust since the arsenate of lead keeps the sulphur from packing.

Miss Dorothy Coker has just completed her thesis on *Encalypta* with drawings of 8 species, in partial fulfillment of the requirements for an M.A. degree from Columbia University. Her

major work has been on bacteriology at the College of Physicians and Surgeons and she has volunteered to serve with one of the Woman's Medical Units that are going to France.

Dr. George Franklin Gaumer, of Izamal, Yucatan, with his daughter, recently spent a day here examining the collection of cacti with Dr. Britton and discussing various problems in connection with his own work on the flora of that district of Mexico. He is training his daughter to carry forward his biological studies and she will remain with relatives in the United States to attend college.

Miss Elsie M. Kittredge, who has recently been appointed to take charge of the lantern slides at the Garden, has been granted leave of absence for the summer, to continue the collection of plants at Woodstock, Vermont, for the Herbarium of Miss Elizabeth Billings, secretary of the Woman's Auxiliary. Last summer Miss Kittredge added several species which had not been recorded for the flora of the state and expects this year to make a number of photographs of rare plants, suitable for lantern slides.

While the past winter has been very severe on certain forms of plant life it seems to have had no unfavorable effect on the eggs of some of the destructive insects. A small quantity of the eggs of the tussock moth brought into the laboratory this spring has produced thousands of caterpillars. While it is difficult to determine just what per cent. of the eggs were viable, from the number that responded we feel certain that few missed. When we remember that this is only the first crop of the season and that the second brood in summer is many times more numerous, we can appreciate the value of collecting and destroying these egg masses in the spring of the year.

One of the rarest of eastern North American Orchids, *Isotria affinis*, was collected on May 12 at Hempstead, Long Island by Miss Harriet Mulford and her sister. They found two specimens,

one with two blossoms and the other with one. But a few stations are known for this species and it has been found only sparingly and at long intervals. Drawings by Miss Coker and photographs by Miss Kittredge were made and compared with its closely related congener, *I. verticillata*, which was also found growing in the same locality and blossoming at the same time.

The board of managers and the ladies' auxiliary of the New York Zoölogical Society held a very successful garden party in the New York Zoölogical Park on Thursday afternoon, May 16. A military band from Governor's Island, an anti-aircraft gun from the U. S. Navy Yard in Brooklyn, French posters appealing for "liberty loans," and various trophies brought from the French front by Curator William Beebe, gave a war-time atmosphere to the affair. Among the guests, the staff of the New York Botanical Garden was represented by Mrs. N. L. Britton and Dr. Marshall A. Howe.

Conservation lectures, under the auspices of the Caroline and Olivia Phelps-Stokes Fund for the Preservation of our Native Plants, have been given by Mrs. Britton during April and May as Arbor Day talks to the children of several of the Public Schools of the Bronx. Miss Kittredge assisted, taking charge of the colored lantern slides. The students of Evander Childs High School visited the Garden on April 17, to hear this lecture, when they also had the privilege of meeting the Hon. Joseph P. Hennessy, commissioner of parks of the Borough of the Bronx. The latter told them that the cost of keeping the parks of the Bronx clean last year amounted to as much as $25,000. He deplored the lack of civic pride and cleanliness and pleaded for more coöperation from the people who enjoy the parks; stating that so much could be done for the children if this sum of money could be devoted to a better purpose.

Meteorology for April.—The total precipitation for the month was 2.36 inches, of which about 0.3 of an inch (three inches snow measurement) fell as snow. The maximum temperatures re-

corded for each week were *80° on the 2d*, 66° on the 14th, 78° on the 15th, and 73° on the 23d. Minimum temperatures were *28° on the 5th*, 32° on the 13th, 38° on the 21st, and 34° on the 25th.

ACCESSIONS

MUSEUM AND HERBARIUM

10 specimens of fungi from Wisconsin "Fungi Wisconsinenses Exsiccati," decade 5. (Exchange with Dr. J. J. Davis.)

54 specimens of parasitic fungi from the local flora range. (Collected by Mr. Percy Wilson.)

326 specimens of fungi from Porto Rico. (Collected by Professor F. L. Stevens.)

3 specimens of fungi from New York. (By exchange with Professor H. M. Fitzpatrick.)

1 specimen of *Pithya pithya* from Colorado. (By exchange with Ellsworth Bethel.)

50 specimens of fungi from North Africa, "Mycotheca Boreali-Africana," fascicles 11 and 12. (Distributed by R. Maire.)

1 specimen of *Sclerotinia Geranii* from New York. (Collected by Dr. F. J. Seaver.)

92 specimens of flowering plants from Cuba. (Collected by Bro. Hioram.)

228 specimens of flowering plants from British Columbia and Alaska. (By exchange with the Geological Survey of Canada.)

247 specimens of flowering plants from Mexico. (By exchange with Mr. C. A. Purpus.)

299 specimens of flowering plants from Colorado. (By exchange with Miss Florence Beckwith.)

6 specimens of mosses from Cuba. (By exchange with Bro. Hioram.)

55 specimens of mosses from Wisconsin. (By exchange with Arovilla Taylor.)

4 specimens of mosses from Florida. (By exchange with Severin Rapp.)

205 specimens of mosses from the Philippine Islands. (By exchange with the Bureau of Science.)

PLANTS AND SEEDS

1 plant of *Oxalis violacea*. (Given by Miss E. M. Kittredge.)

1 plant of *Actinidia callosa Henryi*. (By exchange with Bureau of Plant Industry.)

1 plant of *Actinidia chinensis*. (By exchange with the Bureau of Plant Industry.)

55 plants for conservatories, from Colombia. (Collected by Dr. F. W. Pennell.)

4 plants of *Echinocereus*. (Given by Mr. S. B. Parish.)

23 plants for conservatories. (Given by Mr. Geo. F. Gaumer.)

1 plant of *Liquidambar formosana*. (By exchange with the Bureau of Plant Industry.)

1 plant of *Opuntia clavata.* (Given by Mr. W. H. Long.)

4 cactus plants. (By exchange with Desert Laboratory, Tucson, Ariz.)

1 plant of *Sedum compactum.* (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

1 plant of *Mamillaria.* (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

1 plant of *Dudleya pulverulenta.* (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

233 hardy plants for herbaceous collections. (Purchased.)

1 plant of *Clematis Davidiana.* (Given by Mr. D. S. George.)

149 plants for hardy woody collections. (Given by Hicks Nurseries.)

116 plants for hardy woody collections. (Purchased.)

12 plants derived from seeds from various sources.

1 packet of seed. (By exchange with Ministry of Agriculture, Giza Mouderish, Egypt.)

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Vol. XIX July, 1918 No. 223

JOURNAL

OF

The New York Botanical Garden

EDITOR

FRANCIS W. PENNELL

Associate Curator

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JOURNAL

OF

The New York Botanical Garden

VOL. XIX July, 1918 No. 223

SEQUENCE OF THE FIRST BLOOMING OF THE ROSE COLLECTION, SPRING OF 1918*

A record has been kept of the first flowering of 359 kinds of bush roses now in the new Rose Garden, primarily for comparison during subsequent years, many inquiries having been made as to the dates of earliest blooming, the record is here published, as follows:

May 11 . . . . Rosa Hugonis.
May 17 . . . . Hoosier Beauty.
Richmond.
May 22 . . . . Rosa rugosa var. rubra.
May 23 . . . . La France.
May 25 . . . . Harrison's Yellow.
Mrs. George Shawyer.
Milady.
May 26 . . . . Irish Elegance.
Irish Simplicity.
Betty.
Madame Edmond Rostand.
Senateur Mascuraud.
Gustave Regis.
May 27 . . . . Amateur Teyssier.
Ecarlate.

*Miss Sexton, whose observations on the rose collection form the basis of this article, was a student in the Garden School during the early spring; on the completion of her course of study, she was appointed an apprentice and detailed for work in the Rose Garden and elsewhere.

Cardinal.
Rosa rugosa var. atropurpurea.
May 28. ....Hansa.
Melody.
Antoine Rivoire.
Florence Pemberton.
Radiance.
Madame Cecile Brunner.
Rodhatte.
George Elgar.
Charlotte Maerts.
Kätzchen Meisner.
Ada Redfield.
Madame Edouard Herriot.
Madame Edmeé Metz.
Marie Antoinette.
J. F. Barry.
Grace Darling.
Autumn Tints.
Cheerful.
Admiral Ward.
Mevrouw Dora van Tets.
May 29. . . .Phyllis.
Red Cap.
Lady Cromwell.
Lucy Ashton.
Green Mantle.
Amy Robsart.
Gloire de Margottin.
Mrs. David Jardine.
Lord Penzance.
Mrs. Wemyss Quin.
Souvenir de Gustave Prat.
Arthur R. Goodwin.
Beauté de Lyon.
Baron von Ploeg.
Meg Merrilies.

Winnie Davis.
Bradwardine.
La Detroit.
Rosalind.
Bessie Brown.
Souvenir de Maria de Zayas.
My Maryland.
Madame Segond Weber.
Edu Meyer.
Cramoise Superieur.
Red-letter Day.
Mrs. Fred Straker.
Duke Frederick II.
Francis Scott Key.
Baby Farbenkönigin.
Ellen Poulsen.
Marie Pavic.
Erna Teschendorff.
Mrs. William H. Cutbush.
White Killarney.
Gustav Grunerwald.
Oscar Cordel.
Colonel Leclerc.
Ophelia.
Irish Glory.
Countess of Shaftesbury.
Earl of Gosford.
Flora McIvor.
Charles J. Grahame.
Ragged Robin.
F. R. Patzer.
Conrad F. Meyer.
May 30. . . . .Panama.
Pharisaer.
Queen Carola.
Lady Ashtown.
Old Gold.

Mrs. Aaron Ward.
Irish Fireflame.
Madame Ravary.
Sunburst.
Crimson Champion.
Killarney Queen.
Earl of Dufferin.
Madame Charles Lutaud.
Madame Jules Grolez.
Commander Jules Schulenberg.
Lieutenant Chaure.
Marquise de Ganay.
A. K. Williams.
Madame Plantier.
Julie Mannering.
Brenda.
Prima Donna.
Madame Jules Grosvenor.
Marchioness of Lorne.

May 31 . . . . . Echo.
Juliet.
Lady Alice Stanley.
Duchess of Wellington.

June 1 . . . . Augusta Victoria.
Madame Leon Pain.
Madame Melanie Soupert.
Mary, Countess of Ilchester.
Lady Ursula.
Lady Pirrie.
Marquise de Sinety.
John Hopper.
Otto von Bismarck.
General Jacqueminot.
Mrs. Frederick W. Vanderbilt.
Eugene Furst.
Robin Hood.
Killarney Brilliant.

Gen.-Sup. Arnold Janssen.
Augustine Guinoisseau.
September Morn.
Gruss an Teplitz.
Gloire de Chedane Guinoisseau.
Jeannie Deans.
Mrs. R. D. McClure.
Totote Gelos.
Chateau de Clos Vougeot.
Colleen.
Madame Gabriel Luizet.
Juliette.
Jules Margottin.
Constance.
Roger Lambelin.
Alfred Colomb.
Miss Cynthia Forde.
Natalie Bottner.
Marie Adelaide.
Cardinal.
Hadley
Commander Jules Gravereaux.
Mrs. A. E. Coxhead.
Cherry Page.
Janet.
Duchess of Westminster.
June 2. . . Madame Jules Potin.
Rose à parfum de l'Hay.
Farbenkönigin.
James Coey.
Doctor O'Donel Browne.
Etoile de France.
Maharajah.
Mrs. R. G. Sharman-Crawford.
Ghislaine de Feligonde.
Madame Abel Carrière.
Crimson Queen.

Josephine.
Willowmere.
Magna Charta.
Molly Sharman-Crawford.
Soleil d'Or.
J. B. Clark.
Souvenir of Henry Graham.
Georg Hofer.
Madame Eugene Marlitt.
Madame Ruau.
Louis van Houtte.
King George V.
Mrs. P. L. Baudet.
Joseph Hill.
Harry Kirk.
Amalie de Greiff.
Madame M. Brabanson.
Homère.
Lady Plymouth.
Lady Catherine Rose.
Queen Wilhelmina.
Grace Molyneux.
Cissie Easlea.
Veluwezoom.
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Jacques Kneppers.
Paquerette.
Yvonne Rabier.
Marie Brissonet.
Clothilde Soupert.
Jessie.
Mrs. Wakefield Christie-Miller.
Los Angeles.
Triomphe Orleanais.
Maman Turbat.
Dean Hole.
Ethel Malcolm.

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Francois Coppée.
Edgar M. Burnett.
Karl Druschki.
Frederick Vercellone.
Rayon d'Or.
Viscountess Folkestone.
Souvenir du Pres. Carnot
G. W. Kershaw.
Hugh Dickson.
Heinrich Munch.
Mrs. A. M. Kirker.
Dark Pink Killarney.
Mrs. A. R. Waddell.
Madame Maurice de Luze.
Red Radiance.
Nova Zembla.
Tom Wood.
Crimson Champion.
George Dickson.
Ulrich Brunner.
Vick's Caprice.
Marie du Blois.
Lady Greenall.
La Tosca.
Laurent Carle.

William Shean.
June 3. . . . .Mrs. Andrew Carnegie.
National Emblem.
Helen Good.
Imogen.
Mrs. Karl Smid.
Queen Emma.
Miss Alice de Rothschild.
Madame Jules Gouchault.
Madame Abel Chatenay.
Barbarossa.
W. E. Lippiatt.
Anna de Diesbach.
Reine Marguerite d'Italie.
Catherine Seyton.
John Keynes.
Souvenir de la Malmaison.
White Maman Cochet.
Jonkheer J. L. Mock.
Mlle. Valerie Baumetz.
Zephyrine Drouhin.
Maman Cochet.
June 4. . . . .Cabbage.
Susanne-Marie Rodocanachi.
Perle von Godesberg.
Souvenir de Pierre Notting.
Yellow Cochet.
Etoile de Lyon.
Mrs. George Norwood.
Leslie Holland.
Josephine.
Irish Engineer.
Magnafrano.
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Paeonia.
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Robert Duncan.
June 5. . . . .Xavier Olibo.
Red Moss.
Salet.
Hugh Dickson.
Duchess de Brabant.
Mrs. Amy Hammond.
Mrs. Charles E. Pearson.
Paul Neyron.
June 6. . . . .Lady Hillingdon.
Candeur Lyonnaise.
Clio.
Her Majesty.
Orleans.
James Veitch.
Madame Hoste.
Perle de Lyon.
Madame Edmond Sablayrolles.
Birdie Blye.
June 8. . . .Prince Camille de Rohan.
Mousseaux Ordinaire.
Margaret Dickson.
Eugenie Guinoisseau.
Blanche Moreau.
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Most of the kinds in the collection except those planted this spring had flowered by June 8. A few, not above listed, are omitted owing to uncertainty regarding their names.

MARGARET V. SEXTON

INJURY TO EVERGREENS

In an article on this subject, published in the March issue of this JOURNAL, attention was called to injury inflicted on certain evergreens by the unusual weather conditions of February. Slight injuries to other evergreen plants were noted at that time, but the indications were not sufficiently pronounced to make a definite statement in regard to them. Notable then was the Japanese holly, *Ilex crenata*, the injuries to which, though relatively slight at that time, later developed to an alarming extent. Some plants of this, at the time of writing late in June, are apparently dead, others are so severely injured that they have died back to the ground, still others have been killed back to the main stems and larger branches, and but few show no injury whatever. The destruction of this, considered one of the best broad-leaved evergreens at the Garden, is disappointing, but its successful resistance to the usual winter conditions of this latitude, as manifested for many years back, makes advisable its retention among our best plants of its class.

Among the spruces there has been little trouble. In a group of five specimens of *Picea Omorika*, located east of the fountain

enclosure at the foot of the Museum approach, an exposed and windy situation, one plant was killed and another considerably damaged. Specimens of this species, in the more sheltered location of the west border, received no injury. Two specimens of *Picea orientalis*, each from a different source, were killed.

Among the firs, *Abies*, none of those considered in the earlier article on this subject have been killed. Those reported then were *Abies cilicica*, *A. Momi*, *A. grandis*, *A. numidica*, *A. cephalonica*, and *A. Nordmanniana;* these are mostly recovering rapidly, even *A. numidica*, which was so badly burned, showing a slow but steady improvement. The specimens of *A. cephalonica*, even the ones at the west end of the Long Bridge which were most severely injured and appeared dead for a time, are recovering. Another, not reported before, is the Spanish fir, *A. Pinsapo*. In sheltered situations, plants of this, which had safely passed through previous winters, were seriously injured, in one case the injury resulting in the death of the plant. Those which survived destruction are making a slow and uncertain recovery. *Abies nobilis*, though burned on the leaf-tips, is rapidly recovering. With few exceptions, *Abies concolor* has come through without serious damage; the variety *falcata* did not fare so well, the entire top of one specimen being killed.

All of the hemlocks, with the exception of *Tsuga diversifolia*, have had the foliage more or less burned. A specimen of *Tsuga canadensis* var. *gracilis* lost practically all its leaves, but new ones are now appearing, so that the injury will soon be remedied.

In the genus *Cedrus* the destruction has been marked, none of the specimens escaping injury. *Cedrus Deodara* was represented in the collection by three specimens. Two of these are all but dead, only the lowermost branches being alive; they will probably die. The other specimen has three stems, and one of these appears to be alive to the top. It may survive. This tree was killed back to the snow-line in the severe winter of 1904–5, the present stems being suckers from the old plant. *Cedrus atlantica*, a small specimen, was considerably damaged, but is improving and promises eventually full recovery; the variety *glauca* of this species had the foliage much burned, but is putting out a

profusion of new leaves, and will soon appear as usual. The Cedar-of-Lebanon, *Cedrus Libani*, was represented by a single specimen about three feet high; this was killed with the exception of one or two of the lower branches, and there is little hope for its recovery.

There is a large group of the Japanese cedar, *Cryptomeria japonica*, in a well-sheltered position at the north end of the herbaceous grounds valley. This is represented in several forms or varieties. What is considered the typical form has been more or less damaged, more so than in previous winters; but none of the plants was killed, and all promise full recovery. Individual degrees of hardiness were here demonstrated, for plants of the same origin have been differently affected, some coming through almost untouched, while others were considerably burned. Some tall specimens, twenty feet in height, have had individual branches burned, while other branches were not damaged in the least. The variety *Lobbii* was not injured, being now as bright and green as ever.

Thuja orientalis has suffered more severely than usual, but none of the specimens was killed; all will probably recover and present their usual appearance. Our native arbor vitae, *Thuja occidentalis*, did not suffer as much as in previous winters.

The red cedars, *Juniperus*, have been exceptionally free from injury, even *Juniperus pachyphloea*, a very uncertain element in this latitude, indicating no more than the usual injury.

The genus *Chamaecyparis*, as a whole, has fared better than usual. The Japanese species have come through the winter remarkably well, even *C. pisifera* and its forms, which commonly suffer considerably, showing little evidence of damage. One of the American forms, *C. Lawsoniana*, was not so fortunate, the group of these plants situated in the low land near the South Gate being very severely damaged; while the specimens at the foot of the Woodlawn Bridge approach showed no more than the usual evidence of damage.

Among the yews the injury has been less than usual. It has been mainly the fastigiate forms of *Taxus baccata*, both green and yellow, which were affected; the damage is only temporary

and they will soon regain their former appearance. *Taxus baccata* var. *adpressa* was totally killed. As usual, the Japanese yew, *Taxus cuspidata*, in all its forms, has not been hurt in the least. *Cephalotaxus Harringtoniana* var. *fastigiata* is all but killed, and is breaking very weakly.

The pines, as customary, have shown themselves well adapted to this latitude. All the species under cultivation at the Garden, a list of which will be found in the issues of this JOURNAL for March and April, 1917, have suffered no injury, with the single exception of *Pinus Sabiniana*, a native of California. There are two specimens of this, the one in a situation more exposed to the wind sustaining no injury, the other, on a slope facing the south, losing some of its lower branches.

Among the broad-leaved evergreens the one to suffer the most has been *Ilex crenata*, already referred to. Here individual specimens have shown themselves more resistant. In the beds north of conservatory range 1 there are a number of plants; in bed 5 there a is group of three, one of which is but little hurt, another considerably more damaged, while the third is badly affected —all will recover in time. Here under apparently identical conditions three plants have been affected in a markedly diverse manner. In bed 2 there are three plants, two in the northeast corner and one in the southwest; these have not been hurt in the least, but are as bright and green as ever. Other plants in these beds have been damaged, but to a less degree than elsewhere, as they are protected by surrounding shrubs. One of the attractions in the neighborhood of the Museum has been the fine specimens of this holly around the fountain enclosure at the foot of the approach to the building. These have been the admiration of all visitors. The plants have been there for many years, and but once before, about two years ago, were they damaged, and then only the smaller branches. The past winter, however, has all but destroyed this fine group. The first indication of injury was noted after the warm spell in February. The damage first showed in those plants which received the maximum of direct sunlight. As the days advanced it became more manifest by the browning of the leaves, this progressing until

the plants finally shed practically all their foliage. The cambium remained green and sappy for some time, but finally this dried, except in the main stems and at the very base of the plant. A majority of these plants are now showing some activity by an endeavor to produce foliage along the main stems or from the base. It is too early as yet to judge what the ultimate result will be. In the fruticetum, where the plants are exposed to the sweep of the wind, the damage has been severe, most of the plants being killed to the ground; at the time of writing, late in June, some of these are breaking along the main stem or from the base. Boxwood in the main has not suffered more than usual. Those at the fountain enclosure in the neighborhood of the Museum are in fine condition, while those at the fruticetum, although in some instances rather badly burned, will recover.

Among the rhododendrons the damage, as a whole, has not been greater than in the two years previous. The plants at the fountain in front of the Museum, though somewhat yellowed, have recovered rapidly and are now in a vigorous growing condition. This applies also to those at conservatory range 1, where they flowered profusely this year. There is a group of a certain *Rhododendron*, on the wooded bank south of the upper lake, which has suffered much in past winters, particularly two years ago when the centers of the plants were killed back. Strange to say these suffered little or no damage the past winter. On the east bank of the same lake, south of the bridge, much destruction was wrought to *R. catawbiense.* The conditions here are particularly trying. Some of the plants have succumbed in winters past, but not to the great extent of last winter. After the warm spell in February, with the accompanying strong drying wind, it was noticed that the foliage of certain plants remained drooping and shrunken, quite in contrast with their neighbors. Many of these plants thus affected dropped their leaves and finally died.

In closing, to offset the rather long list of casualties, I wish to indicate some coniferous evergreens which have proved satisfactory, even under the trying conditions of the past winter. They are: *Pseudotsuga mucronata; Abies homolepis* and the vari-

ety *umbellata; Abies Veitchii; Abies lasiocarpa; Picea pungens* and its varieties; *Picea polita; Taxus cuspidata* and its varieties; *Thuja Standishii; Juniperus Chinensis*, especially its variety *Pfitzeriana; Juniperus virginiana* var. *glauca; Cryptomeria japonica* var. *Lobbii; Sciadopitys verticillata.*

To the above I would add most of the pines in the Garden collection. Among the white pines of especial value are: *Pinus Peuce, P. Cembra, P. parviflora, P. Strobus* and *P. koraiensis.* Among other pines may be mentioned: *Pinus nigra* and its varieties; *P. Thunbergii; P. resinosa; P. sylvestris;* and *P. montana* var. *Mughus.*

Incidently, it may here be recorded that the damage to certain deciduous shrubs was greater than during any previous winter of our experience. *Ligustrum ovalifolium*, the "California Privet," was practically eliminated, and most of the Deutzias were killed back to the ground.

Mr. Edward D. Adams has kindly sent us notes on winter damage to plants at his residence "Rohallion" in Monmouth County, New Jersey, which is about 35 miles south of The Bronx. *Cedrus Deodara* was killed there as here, and *Cedrus atlantica* about equally damaged as with us.

Abies cephalonica and *Abies Pinsapo* were killed, whereas those here, while much damaged, are recovering.

Thuja occidentalis was badly burned at "Rohallion," but little damaged here; *Thuja* (*Biota*) *orientalis* suffered about equally at both plantations, and the same is true of *Ilex crenata.* It would appear that the advantage of about half a degree in latitude possessed by "Rohallion" did not, under last winter's conditions, serve to afford any advantage to evergreens.

GEORGE V. NASH

TENTH ANNIVERSARY OF THE SCHOOL GARDEN ASSOCIATION OF NEW YORK

The tenth anniversary meeting of the School Garden Association of New York, was held at the New York Botanical Garden on the afternoon of June 8, 1918, with a large number of

members in attendance. The arrangements were in charge of Dr. Marguerite T. Lee, Secretary. Addresses were delivered in the Mansion lecture room, Miss Margaret Knox presiding, by Dr. N. L. Britton, who welcomed the association on behalf of the Garden, outlined the walking program for the afternoon, and described the work of the Garden School in cooperation with the International Children's School Farm League; by Mr. Van Evrie Kilpatrick, First Vice-President of the School Garden Association, who spoke relative to its origin, history and work; and by Mrs. Henry Parsons, guest of honor, who described some of her notable work in organizing and conducting children's school gardens in the city.

Under the guidance of Dr. Howe, Dr. Southwick, Mr. Wilson, Mrs. Britton, and Miss Sexton, the party then proceeded to the School Garden, the Rose Garden, and to picnic-ground No. 2, where there was festival dancing by children, and thence returned to the Mansion, where tea was served and there was more festival dancing.

After tea the party proceeded up the east side of the river, crossing on the Boulder Bridge to the northern part of the Hemlock Forest, coming out of the forest at the northern end of the Herbaceous Garden Valley, which was traversed, the visitors viewing the economic, morphologic and systematic collections successively, with explanations and descriptions by Dr. Southwick. The trip ended by passing through the flower gardens at Conservatory Range No. 1. The weather was perfect.

"A LITTLE VISIT TO HEAVEN*

"Editor Globe:—In these war-clouded days if one can drop his or her burdens of care for a few hours, and slip away to heaven for recreation and inspiration and come back with deepened insight and fresh courage, surely it is a wise thing to make such an excursion to the heavenly country. Having recently enjoyed this experience the writer wishes to tell other care-laden souls

*The Globe and Commercial Advertiser, New York, Monday, May 27, 1918.

how they can readily enjoy it; also, how to get there, and about some of the delights they may behold there.

"The nearest to heaven that 'little old New York' comes is in the upper reaches of Bronx Park, and more particularly in that portion of it which the Botanical Gardens have in the past few years made so rarely beautiful. If one goes up on the Third avenue elevated the very last stop brings him within sight of the vast conservatory with its dome-shaped roof of glass. From here a short walk will bring him to the large museum, where the lover of growing plants and student of botany will find much to interest him.

"But it is the 'glory of living nature' all over these wonderful gardens that makes this great park so like heaven. There is in particular a little shallow valley there, through the center of which the tiniest possible stream of the clearest possible water gently flows, and the whole surroundings of velvety grass and early spring foliage in every shade of green, with bloom of the early flowers and the fruit blossoms, make this little vale of beauty seem almost heavenly. And for a month to come, in this season of flowering plants with the perfume of new growth and the fragrance of roses and other flowers, it is to be enjoyed at its very best, and it surely seems the vestibule of heaven, if not the 'land of pure delight' in very truth.

"It is a place for tired mothers and groups of happy children. And on a recent visit there I found several such groups. With one the mother was in black, but the party of four children, three girls and a boy, were neatly dressed, with shining faces and unsoiled clothes. They had just had their picnic lunch, and made room for me on their bench. The littlest one was very friendly, and confidingly placed her hand in mine. 'Did they like stories?' They did. 'Would they like to hear a story of a bear?' They would indeed. So I told them the story, the altogether delightful and the o'ertrue story, of the 'Bear That Took a Ride on a Railroad Car.' And they all thanked me for it, and the littlest one quickly ran to the family basket and brought me a huge gumdrop as a reward. (It was very good.)

"Such is the human element in an excursion into heaven; the

people one meets there are sure to be friendly and considerate, especially the children. It was said of old by the wisest of all teachers that 'of such is the kingdom of heaven.' And this I know—that when the tired mother and the little group left me and took up their line of march toward the zoo, the littlest one turned back three or four times to wave her hand to me. So I know that she is of those of whom the kingdom is made.

"And so one returns from a little visit to heaven with a deepened vision into the goodness of God and the true worth of human nature; with a renewed sense of the eternal values; with fuller reverence for the nature, even the human nature, that praises God, and with greater courage to take up and carry the burdens of care that all must bear, and to help 'carry on' the good fight for freedom, righteousness, and peace.

"Brooklyn, May 20. AMERICAN."

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Rubus. BLACKBERRY

Rubus argutus. TALL BLACKBERRY.
Location: Fruticetum.
Natural distribution: Eastern United States.

Rubus canadensis. CANADIAN BLACKBERRY.
Location: Fruticetum.
Natural distribution: Northeastern North America.

Rubus crataegifolius. THORN-LEAVED BLACKBERRY.
Location: Fruticetum.
Natural distribution: Japan.

Rubus fruticosus. EUROPEAN BLACKBERRY.
Location: Fruticetum.
Natural distribution: Europe.

Rubus laciniatus. CUT-LEAVED EUROPEAN BLACKBERRY.
Location: Fruticetum.
Natural distribution: Europe.

Rubus Linkianus: LINK'S BLACKBERRY.
Location: Fruticetum.
Horticultural origin.

Rubus nigricans. BRISTLY BLACKBERRY.
Location: Fruticetum.
Natural distribution: Northeastern United States and Quebec.

Rubus occidentalis: BLACK RASPBERRY.
Location: Fruticetum.
Natural distribution: Eastern North America.

Rubus permixtus. CONFUSED BLACKBERRY.
Location: Fruticetum.
Hybrid.

Rubus phoenicolasius. WINEBERRY.
Location: Fruticetum.
Natural distribution: China and Japan.

Rubus recurvans. RECURVED BLACKBERRY.
Location: Fruticetum.
Natural distribution: New England.

Rubus rosaefolius. STRAWBERRY-RASPBERRY.
Location: Fruticetum.
Natural distribution: Himalayan Region to Japan.

Rubus spectabilis. SALMONBERRY.
Location: Fruticetum.
Natural distribution: Alaska to California.

Rubus strigosus. RED RASPBERRY.
Location: Fruticetum.
Natural distribution: Northern North America.

Rubus triphyllus. SMALL-LEAVED RASPBERRY.
Location: Fruticetum.
Natural distribution: China and Japan.

Rubacer. THIMBLE-BERRY

Rubacer odoratum. THIMBLE-BERRY.
Location: Fruticetum.
Natural distribution: Eastern North America.

Oreobatus. ROCKY MOUNTAIN RASPBERRY

Oreobatus deliciosus. ROCKY MOUNTAIN RASPBERRY.
Location: Fruticetum.
Natural distribution: Rocky Mountains.

Rosa. ROSE

Rosa acicularis. PRICKLY ROSE.
Location: Fruticetum.
Natural distribution: North temperate regions.
Rosa arvensis. AYRSHIRE ROSE.
Location: Fruticetum.
Natural distribution: Europe.
Rosa Beggeriana. BEGGER'S ROSE.
Location: Fruticetum.
Natural distribution: Temperate Asia.
Rosa canina. DOG ROSE.
Location: Fruticetum.
Natural distribution: Europe.
Rosa carolina. PASTURE ROSE.
Location: Fruticetum.
Natural distribution: Eastern United States.
Rosa Copelandi. COPELAND'S ROSE.
Location: Fruticetum.
Natural distribution: California.
Rosa ferruginea. RED-LEAVED ROSE.
Location: Fruticetum.
Natural distribution: Europe.
Rosa hispida. HISPID ROSE.
Location: Fruticetum.
Natural distribution: Europe and western Asia.
Rosa Jundzilli. GLANDULAR DOG ROSE.
Location: Fruticetum.
Natural distribution: Europe and Asia Minor.
Rosa lutea var. **Harrisonii.** HARRISON'S YELLOW ROSE.
Location: Fruticetum.
Horticultural origin.

Rosa Lyoni var. **alba.** LYON'S WHITE ROSE.
Location: Fruticetum.
Natural distribution: Eastern North America.

Rosa multibracteata. MANY-BRACTED ROSE.
Location: Fruticetum.
Natural distribution: Western China.

Rosa multiflora. MANY-FLOWERED ROSE.
Location: Fruticetum. On rocks in Herbaceous grounds. Along path southeast of Museum.
Natural distribution: China and Japan.

Rosa multiflora var. **flore-plena.** DOUBLE MANY-FLOWERED ROSE.
Location: Fruticetum.

Rosa nitida. NORTHEASTERN ROSE.
Location: Fruticetum.
Natural distribution: Northeastern North America.

Rosa nutkana. NOOTKA ROSE.
Location: Fruticetum.
Natural distribution: Northwestern North America.

Rosa palustris. SWAMP ROSE.
Location: Fruticetum.
Natural distribution: Eastern North America.

Rosa Petersiana. PETERS' ROSE.
Location: Fruticetum.
Natural distribution: California.

Rosa pimpinellifolia. ALTAI ROSE.
Location: Fruticetum.
Natural distribution: Region of Altai Mountains.

Rosa rubiginosa. SWEETBRIER.
Location: Fruticetum.
Natural distribution: Europe.

Rosa rugosa. RAMANAS ROSE.
Location: Fruticetum.
Natural distribution: Japan.

Rosa rugosa var. **alba.** WHITE RAMANAS ROSE.
Location: Fruticetum.

Rosa Solanderi. MEADOW ROSE.
Location: Fruticetum.
Natural distribution: Eastern North America.

Rosa stylosa. LONG-STYLED ROSE.
Location: Fruticetum.
Natural distribution: Europe.
Rosa villosa. VILLOUS ROSE.
Location: Fruticetum.
Natural distribution: Europe and western Asia.
Rosa virginiana. SHINING ROSE.
Location: Fruticetum.
Natural distribution: Eastern North America.
Rosa Watsoniana. WATSON'S ROSE.
Location: Fruticetum.
Natural distribution: Japan.
Rosa Wichuraiana. MEMORIAL ROSE.
Location: On rocks at west ridge of Herbaceous Grounds.
Natural distribution: Japan.
Rosa Woodsii. WOODS' ROSE.
Location: Fruticetum.
Natural distribution: Western North America.

NOTES, NEWS AND COMMENT

Sir Francis Walts, Commissioner of Agriculture for the British West Indies, spent Saturday, June 21, at the Garden as the guest of Dr. Britton. Dr. Walts was on his way home to Barbadoes, after visits to Jamaica and to the Bahamas. For lack of steamer communication he was obliged to travel by motor-boat from Nassau, New Providence, Bahamas, to Miami, Florida.

Professor H. C. Beardslee, of Asheville, North Carolina, recently spent several days at the Garden looking over the collections of fleshy fungi.

Professor P. J. O'Gara, of Salt Lake City, Utah, and Professor Raymond J. Pool, of Nebraska State University, were recent visitors at the Garden.

Dr. John K. Small, head curator, recently returned from an extended collecting trip in southern Florida.

The herbarium has been enriched by a collection of over five hundred specimens from Amboina. These specimens were collected by the late Dr. C. B. Robinson, formerly a member of the Garden staff, during his exploration of Amboina, under the auspices of the Philippine Government, in the latter half of 1913.

An illustrated book on the fern-plants of tropical Florida (Ferns of Tropical Florida), has recently been published by Dr. John K. Small. The text is from observations and notes on the ferns and fern-allies made by Dr. Small during his exploration of the Everglade Keys and the Florida Keys in southern Florida. Fifty-one kinds, representing four orders, nine families, and thirty genera are described and figured. Notes on the habitat, geographic distribution, and the date of the discovery of each species in Florida follow the description.

Vol. 17 of the Memoirs of the Torrey Botanical Club, consisting of the Proceedings of the Semi-Centennial Anniversary of the Club, was issued on June 10. The volume has 496 printed pages and 15 plates, besides numerous text-figures. Contributions by members of the Garden staff include "Torrey Botanical Club Reminiscences," by Dr. Nathaniel Lord Britton; "Torrey Botanical Club Reminiscences," by Dr. Arthur Hollick; "Historical Sketch of the Torrey Botanical Club," by Dr. John Hendley Barnhart; "Recent Botanical Collecting in the Republic of Colombia," by Dr. H. H. Rusby; "Collecting Fungi at Delaware Water Gap," by Dr. William A. Murrill; "Life-History Studies in *Sclerotinia*," by Dr. F. J. Seaver and Prof. W. T. Horne; "The Individuality of the Bean Pod as Compared with that of the Bean Plant," by Helene M. Boas; and "Statistical Studies of Flower Number per Head in *Cichorium Intybus:* Kinds of Variability," by Dr. A. B. Stout and Helene M. Boas.

An important taxonomic work based in considerable part on material secured by various expeditions sent out by the Garden is a 79-page paper on the "Uredinales of Cuba," by Prof. J. C. Arthur and J. R. Johnston. The volume was edited by Dr. Marshall A. Howe.

The police of the Fifty-third Precinct, under Captain John Ievers, pursuant to a request of the Police Commissioner, have been using the Museum lecture-hall one evening a week since the middle of June, for the organization and instruction of the Women's Police Reserve and the Emergency Relief Organization of the Police Department.

The will of Mrs. William Combe, recently probated, provides a bequest of $5,000 for the New York Botanical Garden. This was given subject to the life-interest of her mother, but her mother being predeceased, the bequest will be payable as soon as the estate can be divided in accordance with the terms of the will. Mrs. Combe has been a Life Member of the Garden since 1900.

The officers and members of the American Fund for French Wounded were given the facilities of the Mansion on the afternoon of Saturday, June 15, and were escorted to the Rose Garden and other parts of the grounds by members of the Garden staff and members of the Horticultural Society of New York. Mrs. Ethelbert Nevin, Honorary Chairman of the Fund, Mrs. Charles M. Chapin, Chairman, and Mrs. Walter P. Bliss, Treasurer of the New York Branch, acted as hostesses. Mr. Newbold, Mr. Havemeyer, and Dr. Britton represented the Garden and the Horticultural Society.

The New York Microscopical Society held a field meeting at the Garden on the afternoon on June 8, 1918, for the study and collection of pond life; most of the time was spent at lakes nos. 2 and 3, when many minute treasures were found, both animal and vegetable.

On June 18 and 19 about three hundred and two hundred students from the Morris and the Evander Childs High Schools respectively visited the Garden in connection with their work in biology. The students were accompanied by their teachers and members of the Garden staff acted as guides. Assembling at the south plaza of the conservatory, range 1, they were sent through the greenhouses in groups of thirty to forty, each group being accompanied by a guide, entering at the cactus house wing and leaving by way of the aquatic house. In the course of the trip attention was called to the conditions of light and moisture in each house, notice being taken of a number of economic plants which are to be found in this climate only in greenhouses. After leaving the conservatory a trip was made through the herbaceous grounds, especial attention being given to the economic collections. A study was made of at least ten different kinds of trees in the herbaceous grounds and in the vicinity of the museum building. After making a brief study of the collections in the economic museum a lecture was attended in the auditorium on the subject of forestry. The weather was ideal and the trip proved to be both instructive and enjoyable.

The New York County Chapter of the American Red Cross entertained the Japanese Red Cross Mission, headed by Prince Tokugawa, at the Mansion on Monday, July 22, serving lunch to the party at half past one. Brief addresses were made by Mr. Leo Arnstein, Chairman of the Executive Committee of the New York County Chapter, and by Prince Tokugawa. The visitors were escorted to several points in the grounds after lunch, including the Rose Garden, the Water Gardens, and part of the Hemlock Forest, and left about half-past three to visit the United States General Hospital No. 1 on Gun Hill Road. The hostesses of the luncheon were Mrs. Henry P. Davidson, Mrs. August Belmont, Miss Catharine S. Leverich, Miss Ellen Louise Adee, Mrs. W. K. Draper, and Miss Mary Parsons. Japanese flags were flown with the stars and stripes, and the occasion was very enjoyable, limited only by the high temperature of about 96°, which restricted active operation.

A visit to the Horticultural Collections is now timely. These are located a short distance to the north of the southern boundary of the Garden, and to the east of the Southern Boulevard. The garden phloxes are now in bloom, and the cannas are beginning to put forth their blossoms. The main feature, however, is the large collection of gladioli, about 20,000 corms of which were planted the past spring and early summer. Many of these are now coming into bloom and will be followed by many other kinds, so that for some weeks to come there will be a great show of color. There are about 215 kinds in the collection.

Meteorology for May.—The total precipitation for the month was 7.80 inches, an unusually heavy rainfall for any month of the year. The maximum temperatures for each week recorded at the Garden were 92° on the 6th, 78° on the 13th, 83° on the 23d, and *94° on the 28th*. The minimum temperatures were *38° on the 2d*, 41° on the 11th, 50° on the 24th, and 51° on the 30th.

Meteorology for June.—The total precipitation for the month was 4.36 inches. The maximum temperatures recorded for each week were *93° on the 2d*, 81° on the 12th, 83° on the 19th, and 81° on the 24th. The minimum temperatures were 52° on the 8th, 47° on the 15th, *45° on the 22d*, and 53° on the 28th.

ACCESSIONS

MUSEUMS AND HERBARIUM

221 specimens of flowering plants from Missouri. (Collected by Mr. B. F. Bush.)

2 specimens of flowering plants from Louisiana. (Given by Mr. E. C. Wurzlow.)

106 specimens of flowering plants from Western Canada. (By exchange with the Geological Survey of Canada.)

118 specimens of plants from Japan. (By exchange with Mr. James R. Wier.)

240 specimens of flowering plants from Mexico. (Collected by Mr. C. A. Purpus.)

524 specimens of flowering plants and ferns from Amboina. (By exchange with the Bureau of Science, Manila.)

284 specimens "Plantae Fischerianae" from Argentina. (Collected by Mr. Walter Fischer.)

1 specimen of *Diatrypella missouriensis* from Ontario, Canada. (By exchange with Professor J. Dearness.)

3 specimens of fungi from Montana. (By exchange with Dr. James R. Weir.)

1 photograph of *Psathyrella Stevensonii* from Porto Rico. (By exchange with Professor John A. Stevenson.)

281 specimens of rusts from the Local Flora range. (Collected by Mr. Percy Wilson.)

1 specimen of *Craterellus Cantharellus* from New York. (By exchange with Mrs. I. J. Martin.)

1 specimen of *Croton argyranthemus* from Florida. (Given by Mr. Severin Rapp.)

1 specimen of *Anthacanthus spinosus* from Haiti. (By exchange with the United States National Museum.)

95 specimens of flowering plants from Indiana. (By exchange with Mr. Charles C. Deam.)

300 specimens of flowering plants from California. (Collected by Dr. A. A. Heller.)

3 specimens of mosses from Oklahoma. (By exchange with Mrs. Frank E. Lowe.)

1,960 specimens of ferns and flowering plants from Colombia. (Collected by Dr. F. W. Pennell.)

276 specimens of flowering plants from Cameroon. (By exchange with Harvard University.)

10 specimens of foods of the Kaivia Indians, of the Torres Reservation, California. (Given by the Museum of the American Indian.)

1 specimen of mesquite-gum. (Given by Dr. H. H. Rusby.)

279 specimens of hepaticae from the herbarium of M. A. Howe. (Given by Miss Caroline C. Haynes.)

2 specimens of *Quercus* from Florida. (Given by Mr. C. T. Simpson.)

26 specimens of ferns from Madagascar. (By exchange with Harvard University.)

3700 specimens of flowering and flowerless plants from Florida. (Collected by Dr. John K. Small.)

1 specimen of *Sphenoclea zeylanica* from Louisiana. (Given by Mr. E. C. Wurzlow.)

66 specimens of flowering plants from Florida. (By exchange with Harvard University.)

SEEDS AND PLANTS

1 plant of *Campanula*. (Given by Mrs. W. W. Kerr.)

11 Florida plants for conservatories. (Collected by Dr. J. K. Small.)

1 plant of *Isotria affinis*. (Given by Miss F. Mulford.)

10 plants for conservatories and nurseries. (By exchange with the Bureau of Plant Industry.)

1 *Opuntia*, from Tryon, N. C. (By exchange with Dr. C. F. Millspaugh.)

1 *Opuntia*. (Given by Mr. R. Leslie.)

1 *Phoenix.* (Given by Mrs. Roswell Skeel, Jr.)

4 palms. (Given by Percy Chubb Estate, through Dr. Greene.)

17 water lilies. (Given by Mr. William Tricker.)

1 plant of *Araucaria excelsea.* (Given by Mrs. M. F. Plant.)

3 plants for conservatories. (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

15 cacti for conservatories. (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

2 plants of *Mamillaria senilis.* (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

731 plants for herbaceous collections. (Purchased.)

302 *Chrysanthemum* plants for horticultural collections. (Purchased.)

1 packet Colorado seed. (Given by Mr. W. W. Eggleston.)

1 packet Florida seed. (Collected by Dr. J. K. Small.)

1 packet seed. (Given by Mr. Otto Buchten, through Dr. H. H. Rusby.)

111 packets of seeds from Colombia. (Collected by Dr. F. W. Pennell.)

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Vol. 3, part 1, 1910. Nectriaceae—Fimetariaceae.

Vol. 7, part 1, 1906; part 2, 1907; part 3, 1912. Ustilaginaceae—Aecidiaceae (pars). (Part 1 no longer sold separately.)

Vol. 9 (now complete), parts 1 and 2, 1907; part 3, 1910; part 4, 1915; parts 5, 6, and 7, 1916. Polyporaceae—Agaricaceae (pars). (Parts 1 and 2 no longer sold separately.)

Vol. 10, part 1, 1914; parts 2 and 3, 1917. Agaricaceae (pars).

Vol. 15, parts 1 and 2, 1913. Sphagnaceae—Leucobryaceae.

Vol. 16, part 1, 1909. Ophioglossaceae—Cyatheaceae (pars).

Vol. 17, part 1, 1909; part 2, 1912; part 3, 1915. Typhaceae—Poaceae (pars).

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Vol. 22, parts 1 and 2, 1905; parts 3 and 4, 1908; part 5, 1913. Podostemonaceae—Rosaceae (pars).

Vol. 25, part 1, 1907; part 2, 1910; part 3, 1911. Geraniaceae—Burseraceae.

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Vol. 34, part 1, 1914; part 2, 1915; part 3, 1916. Carduaceae—Anthemideae.

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JOURNAL

OF

The New York Botanical Garden

EDITOR

FRANCIS W. PENNELL

Associate Curator

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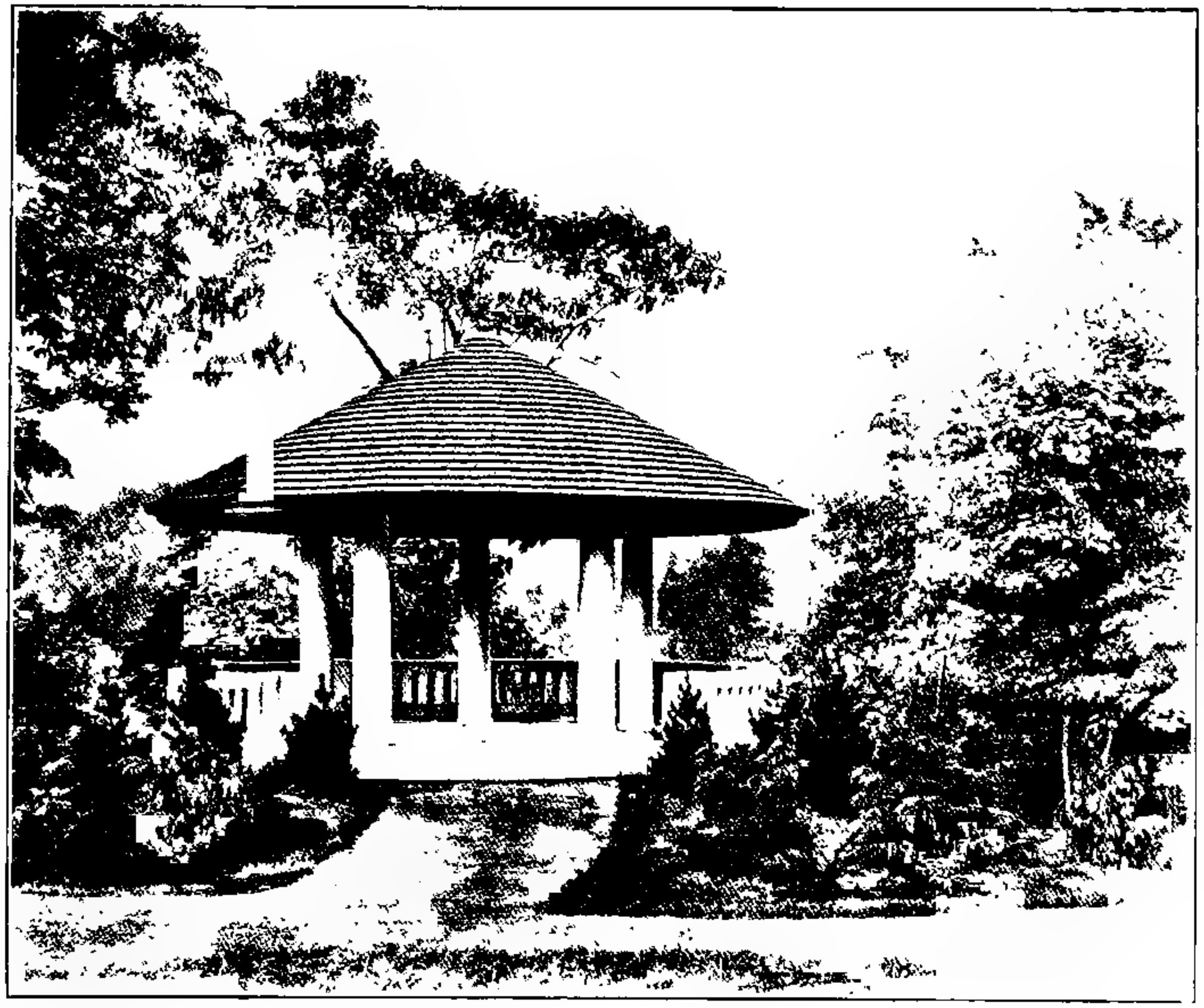

The School Garden Shelter House

JOURNAL

OF

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THE SCHOOL GARDEN SHELTER HOUSE GIVEN BY MRS. FREDERICK FERRIS THOMPSON

Among the gifts for construction and development obtained last year by the Endowment Committee of the Board of Managers was one of $4,000 by Mrs. Frederick F. Thompson, for the construction of the School Garden Shelter House at the southern end of the School Garden, overlooking the Long Lake.* Excavation for foundations for this shelter was commenced in the late summer of 1917, and, after considerable delay in obtaining tiles for roofing, the work was completed in July, 1918.

Plans and specifications, drawn by Messrs. John R. Brinley and Louis F. Bird, were submitted to contractors in the summer of 1917, but satisfactory bids were not obtained, and it was then decided to purchase the necessary materials and to do the work by hired mechanics and laborers under the direction of Mr. Arthur J. Corbett, Superintendent of Buildings and Grounds. The tiles required for the roof, made by the Ludowici-Celadon Company, were furnished and put in place by the Hecla Slate Company. Stone for walls and foundations, sand for mortar, and ashes and gravel for concrete were already on the grounds. The actual cost of the edifice itself has been approximately $3,200; the lowest bid we could obtain for the same work was $3,950. The balance of Mrs. Thompson's gift, about $800, has been utilized for path approaches to the shelter, for water connections to it, and for the drainage, regulation and grading of

*Jour. N. Y. Bot. Gard. 18: 125. June, 1917.

the grounds surrounding it, which were very rough when the work was commenced.

This shelter house is beautifully and picturesquely located on a rocky ledge forming a precipitous cliff, rising about 40 feet above the water level of the Long Lake—a typical gazebo. The site permitted the construction of a commodious tool cellar and storage-room under the floor, a very useful accommodation in this part of the grounds; this cellar is reached from the School Garden by a Telford McAdam path, over which a cart may be driven; it has been equipped with a sink and proper drainage.

The gazeebo is circular, with a floor radius of 14 feet; the floor is of reënforced concrete; an ornamental concrete balustrade occupies the periphery; five reënforced concrete pillars, 10 feet high and 18 inches in diameter, support the conic roof, which slightly overhangs the balustrade and is of yellow pine, put together in small pieces, requiring 6,800 cuts of the carpenters' saws, this covered with tarred paper and with green tile; the central portion of the roof interior is ceiled. The structure provides not alone a charming park feature, but it may also be used for the instruction of students in gardening during the summer.

The planting selected for the immediate surroundings is of low conifers and yews, providing an evergreen setting as viewed from the School Garden. A vista across the Long Lake and through the hillside woods to the rose Garden has been obtained by cutting out three small trees, and another vista southward along the lake may be obtained by removing a few more trees.

Keen appreciation of Mrs. Thompson's gift has been expressed by all who have visited this useful and beautiful structure.

N. L. Britton

JAMES ALEXANDER SCRYMSER

James Alexander Scrymser, Treasurer of The New York Botanical Garden since 1911, died at his home in New York City on April 21, 1918, in the seventy-ninth year of his age.

Mr. Scrymser was one of the original incorporators of The New York Botanical Garden named in the Charter of the in-

stitution granted by the Legislature of the State of New York in 1891. He has served continuously as a member of the Board of Managers since its organization in 1895, and as a member of its committees on Membership, on Finance, and on Endowment. Throughout nearly the whole history of the institution, he has been active in formulating plans for its development and has aided its work by highly valued advice and support.

Resolved: That the Managers of the New York Botanical Garden deeply deplore the loss of their esteemed associate, who was endeared to them by his wisdom and by his kindly personality.

Resolved: That the foregoing preamble and resolution be entered upon the minutes of the Board, published in the JOURNAL of the Garden, and that a copy be sent to his bereaved family.

Adopted by the Board of Managers of the New York Botanical Garden June 20, 1918.

N. L. BRITTON,
Secretary.

MR. PARSONS' GOVERNMENT APPOINTMENT

Mr. Henry Griscom Parsons, Supervisor of Gardening Instruction, was called to government service in the early summer. Commissioned with the rank of Captain in the Quartermaster's Department of the Army, he has been assigned to the Conservation and Reclamation Division, Salvage and Gardening Branch, and put in charge of the farming and gardening operations at the various cantonments, with headquarters at Washington, D. C. Under direction from these headquarters, farming activities are initiated at suitable camps, and managed by an officer of the Camp Quartermaster's Staff. The labor is furnished from men disqualified for overseas service. Actual operations were begun in May of this year. Fifteen Camp Farms are now under way, ranging from 50 acres to 900 acres. This will be increased until the maximum available land is under cultivation, producing fresh vegetables for the men at the point of consumption and saving carrier space.

Instruction in gardening has been temporarily suspended at

the Garden owing to his new sphere of work, but arrangements have been made with his mother, Mrs. Henry Parsons, for the teaching of students who may apply for instruction at one of the school gardens under her charge in the Park Department of Manhattan. In recognition of this cooperation Mrs. Parsons was given the title Honorary Advisor in School Gardening Instruction at the June meeting of the Board of Managers.

Of the fund of about $8,000 raised by subscription by the International Children's School Farm League early in 1917 to cover the expenses of gardening instruction under Mr. Parsons' direction for two years, about $3,000 remains unexpended.

THE BOTANY AND PLANT PRODUCTS OF NORTHERN SOUTH AMERICA*

A cooperative investigation of the flora of northern South America, which, when carried out in detail, should be of highly significant scientific and economic importance, has recently been organized by the New York Botanical Garden, the United States National Museum, and the Gray Herbarium of Harvard University. This investigation is planned to include the plants inhabiting the Guianas, Venezuela, Colombia, Ecuador, and the adjacent Caribbean islands Trinidad, Tobago, Margarita, Bonaire, Curacao and Aruba.

The immediate object is to secure and organize collections of size and excellence from as many different floral areas as may be found feasible; to assemble all knowledge obtainable relative to the distribution of the species, their habitats, and their uses; and thus to acquire in North America materials for critical investigations leading to much needed monographs of important groups and to detailed catalogues of floras as yet very inadequately known.

The region contemplated has great diversity of climate, soil, and altitude and a corresponding wealth of vegetation. Perhaps no area of greater botanical promise has thus far received less organized floral investigation. Nor have the scattered results

*Published also in Science, 48: 156. 1918.

obtained in the past ever been brought together into correlated or accessible form, being at present scattered in fragmentary publications, foreign journals, and casual works of travel, with the result that information even in regard to many plants of considerable economic promise is excessively difficult to assemble and surprisingly scanty when obtained.

In this rich and varied flora of northern South America is sure to be found a wealth of plants capable of yielding commercial timbers, drugs, vegetable oils, tannin, gums, waxes and essences of technical value, dye-stuffs, food-materials, fibers, and countless substances such as rubber highly significant in manufactures. Many of these products are reaching our markets in mixed or imperfect condition owing to inadequate knowledge of the precise plants from which they should be obtained. In other instances, although the species may be known, the range and availability is still too obscure to encourage enterprises of exploitation.

Recent events have shown how suddenly and unexpectedly America may be cut off from many European sources of manufacture and information. It is increasingly evident that all the American countries should gain the manufacturing and commercial independence which may be derived from a thorough scientific investigation of their natural resources. Among these the tropical American vegetation is one of the most significant and merits much more earnest investigation than it has thus far received.

It is confidently believed that the proposed studies will do much to extend the knowledge of South American products, and thus to increase trade and conduce to friendly relations with the countries concerned.

In the realm of pure science the results obtained will also have very important bearings on the studies of central American vegetation already prosecuted by the National Museum and by the Gray Herbarium, and on those of the West Indian flora conducted by the New York Botanical Garden.

The scientists in charge of the botanical collections of the three coöperating institutions and other botanists and economists have long known the need for organized information relative to

the vegetation of northern South America; these collections already contain specimens derived from various sources in the past, representing a considerable proportion of the plants inhabiting the region, and of their products, but much of this material has not been critically studied nor determined botanically. Old World museums and herbaria contain a more complete and better studied representation than American institutions possess. The extensive literature of the subject is, however, measurably complete in our libraries, but scattered under many hundred titles, mostly by European authors.

The investigation is primarily planned along the following lines:

1. The study, naming and cataloguing of specimens already in the three institutions. This work will incidentally much increase the reference strength of our herbaria and museums.

2. The increase of the three collections by specimens obtained through field expeditions sent to parts of the area as yet little known botanically, or in search of species of other areas as yet incompletely understood. Duplicate specimens beyond the three sets required will be distributed to other institutions in exchange. Friends of the institutions may furnish important aid by sending funds to any of them for the expenses of field expeditions.

3. The publication of advanced papers from time to time, dealing with portions of the investigation on which results have been reached, without awaiting the completion of the annotated catalogue.

The cooperative effort includes the following methods:

1. The subdivision of the work among staff members of the three institutions and among specialists of other institutions.

2. The loan of specimens from the collections of the three institutions to each other.

3. Visits of staff members of the three institutions to each other for the study of collections and for consultation.

4. Collections made by any of the institutions to be shared with the others.

5. Joint support of some of the field expeditions and division of the collections made.

Recent collections, the study of which has led up to the co-operative arrangement, include principally those made for the United States National Museum by H. Pittier in Venezuela in 1913; for the Gray Herbarium by J. A. Samuels in Dutch Guiana in 1916, and by H. A. Curran and M. Haman in Curaçao, Aruba, and northern Venezuela in 1917; and for the New York Botanical Garden by H. H. Rusby and F. W. Pennell in 1917 and 1918. The arrangement was consummated through correspondence between Dr. B. L. Robinson of the Gray Herbarium and Mr. Frederick V. Coville and Dr. J. N. Rose of the National Museum with Dr. N. L. Britton of the New York Botanical Garden in the latter part of 1917 and early in 1918, and it has been approved by the governing bodies and officials of the three institutions.

Professor Oakes Ames of the Bussey Institution of Harvard University has offered coöperation which has been gratefully accepted.

The first field expedition organized is one to Ecuador, led by Dr. J. N. Rose, of the United States National Museum; in this, the cooperating institutions are very materially aided by the Bureau of Plant Industry of the United States Department of Agriculture, the Bureau desiring first-hand information about important economic plants which can be obtained only by field observations of a trained botanist. Dr. Rose left Washington on July 22, for an absence of about four months, and it is anticipated that the results of this work will add greatly to our knowledge of the flora and plant products of Ecuador.

The very large collections made by Drs. Rusby and Pennell in Colombia for the New York Botanical Garden are being organized for critical study, and will be divided among the three institutions as soon as possible.

N. L. Britton

THE NEW DAHLIA BORDER

The New York Botanical Garden has long had a few scattered dahlias in the general flower-beds north of Conservatory Range

No. 1 and a few others grown in mass formation near the Propagating House, but has not until this season attempted an adequate representation of the wonderful modern developments of this popular flower. After the establishment of the Rose-Garden, the Iris Garden, and the extensive plantations of tulips, gladioli, paeonies, and rhododendrons, the dahlia seemed entitled to special consideration.

The border just north of the station of the Harlem Division of the New York Central Railroad was set aside for the proposed dahlia plantation. Letters were sent out to some of the best-known commercial growers of dahlias in the East and also to amateurs who had recently taken prizes at the annual dahlia show held at the Botanical Garden by the Horticultural Society of New York, asking for the donation of roots for the proposed border, on condition that name and address of donor should appear on the label for each plant. Response to this invitation, though not unanimous, was generous and sufficient for the purpose.

George L. Stillman, Westerly, Rhode Island, contributed 48 varieties, mostly novelties of his own origination. J. H. Slocombe, 555 Townsend Ave., New Haven, Conn., sent 38 choice varieties, nearly all originated by him. C. Louis Alling, 251 Court St., West Haven, Conn., made a generous shipment of 79 varieties. Henry A. Dreer, 714–716 Chestnut Street, Philadelphia, Pa., contributed 23 carefully selected varieties, five roots of each kind. Leonard and Weber, 763 Parkway Ave., Trenton, N. J., sent 25 high-class kinds. W. J. Matheson, of Huntington, Long Island, through his superintendent, James Kirby, most generously gave 94 varieties, many of them in root-clumps large enough for division. The late Mrs. H. Darlington, of Mamaroneck, N. Y., through her gardener, P. W. Popp, kindly contributed 76 plants, including a few varieties in duplicate. The writer turned in 45 varieties from his garden in Pleasantville, N. Y.

Some of the roots contributed did not arrive until late in June, so were rather late in being planted, but with the usually mild autumns of New York City, it is probable that all will reach the

blooming age before being cut down by frost and it is possible that the final results may be even more satisfactory on account of the late start. Wooden stakes, four, five, and six feet long, were driven at the time of planting, and in so far as the habits of the different varieties were known or ascertainable, an effort has been made to put the taller-growing kinds at the back of the border and the shorter ones in front. No attempt at grouping according to color has been made and there has been little effort at arrangement according to class, though most of the few pompons represented have been placed together.

The border, for most of its length, is four rows wide, the plants standing three feet apart each way, and it was found convenient to plant the varieties of each consignment by themselves in order of receipt. Beginning at the northeast end, the farthest from the railway station, the various contributors appear in the following order: Howe, Matheson, Alling, Stillman, Slocombe, Darlington, Dreer, and Leonard & Weber. A few of the roots and potted green plants failed to develop or grow for one reason or another and occasional substitutions have been made from reserve surplus or from divisions of plants already started. The border as a whole includes 516 plants, representing at the date of writing (July 5) 313 varieties. It may be necessary or desirable to make a very few more substitutions for plants that are starting weak.

Following is a list of varieties represented in the plantation as it now stands, subject to possible slight changes as the season advances. The type or class is indicated by "cac." for cactus, "coll." for collarette, "dec." for decorative, "dup." for duplex, "hyb." for hybrid, "p." for paeony, "pom." for pompon, "sh." for show, and "si." for single. As is well known to dahlia-growers the different classes intergrade somewhat, and in trade catalogues certain varieties may be found listed under two or three different heads. In cases in which a variety is represented by more than one plant, the number of plants is given in parenthesis following the name.

Abundance, dec.
Achievement, coll.
Adelaide, pom.
Albert Manda, (2), dec.

Alice Evelyn, dup.
Alight, cac.
Amber Queen, p.
America, (6), p.
Ami Philip Goy, cac.
Ariel, hyb. cac.
A. R. Perry, cac.
Arthur Kelsey, p.
Attraction, (2), cac.
Aurora, cac.
Autocrat, sh.
Autumn Century, si.
Avanella, p.
Aviateur Garros, (4), cac.
Ayesha, dec.

Balmoral, coll.
Beatrice Slocombe, dec.
Beauport Beauty, cac.
Belle of Springfield, pom.
Beloit, hyb. dec.
Bertha von Suttner, p.
Billy Spear, coll.
Blanche Charmet, dec.
Bobby, pom.
Bouquet d'Or, dec.
Break o'Day, dec.
Breeze Lawn, dec.
Bridal Robe, cac.
Bride, sh.
Brisbane, cac.
Brentwood Yellow, dec.
Bull Moose, cac.
Buster Brown, p.
B. V. Hemstead, (2), dec.

Caecilia, (4), p.
Caleb Powers, (4), sh.
Cambrian, (3), cac.
Candeur, cac.
Caradoc, cac.
Catherine Duer, dec.
Chatenay, (4), p.
Color Blender, coll.
Colossal Peace, hyb. cac.
Cora L., p.
Coronet, cac.
Comtesse Ici Hardegg, coll.
Countess of Kenmare, cac.
Dahliadel Century, si.

Dainty, coll.
Daisy, pom.
Daniel Webster, dec.
David Warfield, sh.
Decision, cac.
Directeur Quennec, cac.
D. M. Moore, (2), dec.
Dora, (7), cac.
Dorothy, (2), cac.
Dorothy Hubbard, dec.
Dreer's White, (7), sh.
Dreer's Yellow, (5), sh.
Dr. H. H. Rusby, p.
Dr. Mene, cac.
Dr. Peary, (3), p.
Dr. Roy Appleton, cac.

Easton, (4), dec.
Eckford Century, si.
Edith Carter, (3), cac.
Edith Cavell, (2), sh.
Edna Story,
E. J. Pease, dec.

Elm City, sh.
Else, (3), cac.
Elsie Davidson, p.
Emma Slocombe, (2), dec.
E. P. Thompson, cac.
Eric Fisher, sh.
Etendard de Lyon (6), cac.
Evening Star, p.

Fascination, sh.
Faust, hyb. p.
F. Earl James, cac.
Feldberg, p.
Ferdinand Olivet, cac.
F. H. Chapman, cac.
Fiery Cross, p.
Firefly, p.
Flamingo, p.
Flieder, cac.
Frances White, (3), cac.
Freda Newman, p.
Fregolia, dup.
Futurity, dec.
F. W. Fellowes, (4), cac.

Gaiety, dec.
Geisha, p.
Geisha Superba, p.
Geneveva, cac.
Gen. J. B. Seth, (5), cac.
Gen. Miles, sh.
Gen. Pershing, hyb. cac.
Geo. L. Stillman, (2), cac.
Geo. Schoefield, cac.
Gertrude Manda, dec.
G. H. James, p.
Giant Purple, dec.
Gigantic, (3), cac.
Gladys L., (2), dec.
Golden Gate, cac.
Golden Plover, (2), cac.
Golden Shore, (2), sh.
Golden Wave, cac.
Gold Medal, (7), sh.
Goliath, cac.
Grace Loretta, coll.
Grand Duke Alexis, sh.
Gretchen Heine, pom.

Hampton Court, p.
Harmony, coll.
Harriet Hubbard, p.
Harry McCoy, p.
Harvest Moon, dec.
Hecla, pom.
Henri Cayeux, cac.
Herbert Raby, cac.
Hibernia, (2), cac.
H. J. Lovinck, p.
Hoffnung, cac.
Holman Hunt, p.
Holyrood, (2), coll.
Hon. R. L. Borden, p.
Hortulanus Fiet, (6), dec.
Hortulanus Witte, dec.

Imperial Elephant, si.
Imp Lady Fair, hyb. cac.
Indomitable, cac.
Irene Carmen ,(2), hyb. sh.
Irene Satis, cac.
Irresistible, cac.

Jean Anderson, p.

Jeanne Charmet, (2), dec.
J. B. Riding, (2), cac.
J. H. Jackson, cac.
J. M. Goodrich, dec.
John Green, p.
John Tozer, sh.
John Wanamaker, (3), dec.
Joseph Erlich

Kalif, (5), cac.
King Edward, p.
King of Autumn, dec.
King of Shows, sh.
K. Robertson.

Lady Helen, dec.
Large Brick Red, dec.
Lawine, cac.
Le Grand Manitou, dec.
Liberty, cac.
Lily, col.
Los Angeles, p.
Louie Blackman, coll.

Mabel Normand, dec.
Mad. X., si.
Magenta Single, (3), si.
Mama Charmet, dec.
Manitou, (3), dec.
Marguerite Bouchon, cac.
Marguerite Clark, p.
Marjorie Field, (3), dec.
Master Carl, cac.
Maud Tripp, p.
Maurice Rivoire, coll.
Melody, cac.
Mildred Slocombe, (2), dec.
Mina Burgle, (9), dec.
Minnewawa, p.
Miss Cabot, dec.
Miss Edna L. Hathaway, dec.
Miss Emma, si.
Miss Loudon,
Mme. Adolphe Bechet, cac.
Mme. Annie Marie Chantre, cac.
Mme. Devinet, dec.
Mme. E. Poirier,
Mme. Eschenauer, (5), cac.
Mme. Heine Furtado, sh.
Mme. J. Coissard, (9), dup. p.
Mme. Louise Perrier, dec.
Mondscheibe, (4), p.
Mons. Capron, dec.
Mons. Lenormand, dec.
Moonbeam
Mrs. A. J. Dupont, (2), dec.
Mrs. Bowen Tufts, p.
Mrs. Chas. H. Breck, (6), cac.
Mrs. Douglas Fleming, (2), cac.
Mrs. Ferdinand Jeffries, (2), cac.
Mrs. G. Gordon, p.
Mrs. H. J. Jones, (2), cac.
Mrs. Hugh Dickson, (3)
Mrs. I. C. Moran, (3), dec.
Mrs. J. H. Slocombe, (2), dec.
Mrs. J. L. Brookes, dec.
Mrs. Minnie Burgess,
Mrs. N. Slocombe, (2), dec.

Mrs. Roosevelt, dec.
Mrs. T. G., Baker, cac.
Mrs. Walter Thompson, sh.
Mrs. Warnaar, (2), hyb. cac.
Mrs. Wiggs, dup.
Mrs. W. W. Crowell,
Mrs. Yates, dec.
Mt. Blanc, dec.
Mt. Shasta, cac.
Nancy Mae, cac.
Neatness, pom.
Neptune, cac.
Nerthus, cac.
Newport Angel, si.
Newport Beauty, si.
Newport Gem, si.
Newport Triumph, si.
New York, (2), cac.
Nibelungenhort, (6), cac.

Old Sol, p.
Oregon Beauty, (11), dec.
Ox Blood, sh.

Paul Kruger, p.
Peggy O'Neil, coll.
Phidias, p.
Pierrot, (4), cac.
Pink Paeony No. 5, p.
Pink Pearl, cac.
Pope Leo XIII, (2), cac.
Prima Donna, cac.
Priscilla, (2), p.
Purity, dec.
Purple Seedling, cac.

Quaker City, hyb. cac.
Queen Esther, p.

Red Chieftain, (4), dec.
Redcoat, cac.
Red Flamingo, (4), dec.
Regularity, cac.
Réné Cayeux, cac.
Rev. A. Bridge, cac.
Rev. Dr. Williamson, cac.
Rev. Floyd Kenyon, (2), p.
Rev. T. W. Jamieson, cac.
Rhein Konig, hyb. cac.
Richard Box, cac.
Richest of All, dec.
Riese von Stuttgart, dec.
Rochester
Roem van Nijkerk, p.
Rose Chapin, dec.
Rose Pink Century, si.
Ruddigore, (2), cac.
Ruth, dec.
Ruth Slocombe, p.

Scarlet Giant, sh.
Seawanhaka, dec.
Seedling xxxx
Seedling No. 18, p.
Semiramis, (2), p.
Sherlock, cac.
Single Bronze Pink, si.
Single Pink, (2), si.
Snowclad, pom.
Soleil Couchant, cac.
South Pole, (2), p.
Souvenir de Gustave Douzon, (8), dec.
Standard Bearer, cac.

Stillman's Red Cross, p.
St. Louis, (2)
Success, (2), cac.
Sulphurea, dec.
Sulphur King, (2), dec.
Sunbeam, (2), dec.
Sweet Brier, cac.

Tango Century, si.
The Heroine, p.
The Imp, cac.
The Lion, cac.
The Millionaire, cac.
The Peach, coll.
Thomy Thompson, p.
Thuringia, cac.
Titian, p.

Ulysse, (6), cac.
Ursa Major,

Valentine, coll.
Vater Rhein, cac.
Verna Thompson, p.
Vicar of Wakefield, sh.
Vivian, sh.

Walkure, cac.
Weber, (3), dup.
White Cap, p.
White Century, si.
White Excelsior, dec.
White Lady, p.
W. J. Matheson, (2), cac.
W. J. Rowe's Pink, dec.
Wolfgang von Goethe, (4), cac.
World's Wonder, dec.
W. W. Rawson, sh.

Yellow Colosse, (3), dec.
Yellow King, (6), cac.
Yellow Prize, coll.
Yellow Seedling, cac.

MARSHALL A. HOWE

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

MALACEAE. Apple Family

Cotoneaster. COTONEASTER

Cotoneaster foveolata. SCARLET COTONEASTER.

Location: Fruticetum.

Natural distribution: Central China.

Cotoneaster multiflora. MANY-FLOWERED COTONEASTER.

Location: Fruticetum.

Natural distribution: Spain to Himalayan Region.

Cotoneaster rotundifolia. ROUND-LEAVED COTONEASTER.

Location: Fruticetum.

Natural distribution: Himalayan Region.

Cotoneaster Simonsii. SIMONS' ROSE-BOX.

Location: Fruticetum.

Natural distribution: Himalayan Region.

Choenomeles. JAPAN QUINCE

Choenomeles japonica. JAPAN QUINCE.

Location: Fruticetum.

Natural distribution: China and Japan.

Choenomeles Maulei. MAULE'S JAPAN QUINCE.

Location: Fruticetum.

Natural distribution: Japan.

Choenomeles Maulei var. **alpina.** MAULE'S LOW JAPAN QUINCE.

Location: Fruticetum.

Choenomeles sinensis. CHINESE QUINCE.

Location: Fruticetum.

Natural distribution: China.

Pyrus. PEAR

Pyrus betulaefolia. BIRCH-LEAVED PEAR.

Location: Arboretum.

Natural distribution: China.

Pyrus communis. PEAR.

Location: Arboretum.

Natural distribution: Southern Europe and Asia.

Pyrus sp.

Location: Arboretum. Has not flowered as yet.

Malus. APPLE

Malus atrosanguinea. CARMINE APPLE.

Location: Fruticetum.

Horticultural origin.

Malus baccata. SIBERIAN CRAB APPLE.

Location: Arboretum.

Natural distribution: Siberia to Manchuria and northern China.

Malus coronaria. NARROW-LEAVED CRAB APPLE.

Location: Arboretum.

Natural distribution: Eastern United States.

Malus Dawsoniana. DAWSON'S APPLE.

Location: Arboretum.

Hybrid.

Malus denticulata. TOOTHED APPLE.

Location: Arboretum.

Horticultural origin.

Malus denticulata var. **plena.** DOUBLE-FLOWERED TOOTHED APPLE.

Location: Arboretum.

Malus glaucescens. AMERICAN CRAB APPLE.

Location: Arboretum.

Natural distribution: Eastern United States.

Malus Halliana. HALL'S CRAB APPLE.

Location: Fruticetum.

Natural distribution: Western China.

Malus ioensis var. **Bechteli.** BECHTEL'S CRAB APPLE.

Location: Arboretum.

Horticultural origin.

Malus Kaido. KAIDO APPLE.

Location: Arboretum.

Natural distribution: Asia.

Malus Niedzwetzkyana. NIEDZWETZKY'S APPLE.

Location: Arboretum.

Natural distribution: Southwestern Siberia and Caucasus.

Malus prunifolia. CHERRY-LEAVED CRAB APPLE.

Location: Arboretum.

Natural distribution: Siberia.

Malus pulcherrima var. **Arnoldiana.** ARNOLD ARBORETUM APPLE.

Location: Arboretum.

Horticultural origin.

Malus pulcherrima var. **Scheideckerii.** SCHEIDECKER'S APPLE.

Location: Arboretum.

Horticultural origin.

Malus Sargenti. SARGENT'S APPLE.

Location: Arboretum.

Natural distribution: Japan.

Malus Sieboldii var. **arborescens.** TREE TORINGO CRAB APPLE.

Location: Arboretum.

Natural distribution: Japan.

Malus Sieboldii var. **calocarpa.** LARGE-FRUITED TORINGO CRAB APPLE.

Location: Arboretum.

Malus sikkimensis. HIMALAYAN APPLE.

Location: Arboretum.

Natural distribution: Himalayan Region.

Malus Soulardi. SOULARD'S CRAB APPLE.

Location: Arboretum.

Hybrid.

Malus spectabilis. CHINESE FLOWERING APPLE.

Location: Arboretum.

Natural distribution: China and Japan.

Malus spectabilis var. **Riversii.** DOUBLE-CHINESE FLOWERING APPLE.

Location: Arboretum.

Horticultural origin.

Malus transcendens. GARDEN CRAB APPLE.

Location: Arboretum.

Horticultural origin.

Malus yunnanensis. YUNNAN APPLE.

Location: Arboretum.

Natural distribution: China.

Malus Zumi. ZUMI APPLE.

Location: Arboretum.

Natural distribution: Central Japan.

Sorbus. MOUNTAIN ASH

Sorbus americana. AMERICAN MOUNTAIN ASH.

Location: Arboretum.

Natural distribution: Northeastern North America.

Sorbus Aucuparia. EUROPEAN MOUNTAIN ASH.
Location: Arboretum.
Natural distribution: Europe and Asia.
Sorbus Aucuparia var. **pendula.** WEEPING EUROPEAN MOUNTAIN ASH.
Location: Arboretum.

Aria. BEAM TREE

Aria Aria. COMMON BEAM TREE.
Location: Arboretum.
Natural distribution: Europe and northern Asia.
Aria latifolia. BROAD-LEAVED BEAM TREE.
Location: Arboretum.
Natural distribution: Europe.

Aronia. CHOKE-BERRY

Aronia arbutifolia. RED CHOKE-BERRY.
Location: Fruticetum.
Natural distribution: Eastern United States.
Aronia atropurpurea. PURPLE-FRUITED CHOKE-BERRY.
Location: Fruticetum.
Natural distribution: Eastern United States.
Aronia melanocarpa. BLACK CHOKE-BERRY.
Location: Fruticetum. East end of Aquatic Garden.
Natural distribution: Eastern North America.

AUTUMN LECTURES, 1918

Aug. 31.	"Autumn Flowers,"	by Dr. N. L. Britton
Sept. 7.	"Gladioli,"	by Prof. A. C. Beal
Sept. 14.	"Evergreens,"	by Mr. G. V. Nash
Sept. 21.	"Dahlias,"	by Dr. M. A. Howe
	(Exhibition of Dahlias, Sept. 21 and 22)	
Sept. 28.	"Flora of the Vicinity of New York,"	by Mr. Norman Taylor
Oct. 5.	"Autumn Coloration,"	by Dr. A. B. Stout

Oct. 12.	"Cut Flowers and How to Use Them,"	by Mr. E. I. Farrington
Oct. 19.	"The Value of Birds in a Garden,"	by Dr. G. Clyde Fisher
Oct. 26.	"Some Plant Diseases of New York and Virginia,"	by Dr. E. W. Olive
Nov. 2.	"Plants as Insect Traps,"	by Dr. J. H. Barnhart

NOTES, NEWS AND COMMENT

Dr. W. A. Cannon, of the Department of Botanical Research of the Carnegie Institution, formerly a student at the Garden, expects to be in Australia about twelve months, where he will make field studies of desert plants with special reference to root habits.

A party of students from the Columbia Summer School, in charge of Mr. Crawford and Mr. Meredith, made an excursion to the Garden on the afternoon of August 6 and were escorted about the grounds by Dr. M. A. Howe and a number of other members of the Garden staff.

Large quantities of vegetable seeds, of kinds which before the war were imported from Europe, must now be grown in the United States. American farmers plant more than 7,000,000 tons of seed per year, most of this, of course, being wheat, corn, cotton, and other staple crops for which the supply of seed has long been produced at home.

The Jerusalem artichoke, *Helianthus tuberosus*—actually a native of this country—appears to be much appreciated by the French as a war plant of the first order. The tubers are food for stock as well as for man. The crop is more satisfactory than the potato, being free from serious diseases, and is produced freely under considerable differences of soil and climate.

Young plants of red cedar, and certain other species of ornamental conifers, have been subject recently to a disease which has caused great loss in a number of nurseries. This seems to be due to a species of *Phoma*, a microscopic parasitic fungus. Spraying has had little effect on controlling its attacks.

China marking pencils, which in black, blue, and red colors may be obtained at slight expense, have been found very useful for making drawings, diagrams, or other markings on lantern slides. The pencil should be properly pointed and must not be lifted from the glass while drawing. A mistake is easily erased with the finger or a blunt piece of wood.

English walnuts are often attacked by Armillaria root-rot, which spreads from one tree to another through the roots. It has been found that if the dirt is dug away until the graft unions are exposed and cylinders of heavy roofing paper placed around the base of the trees and the soil filled in, that the fungus is prevented from entering the walnut trunks.

Plant lice were unusually abundant during July, both on herbaceous plants and trees. Norway maples were attacked by them to such an extent that the leaves were continually falling and the ground beneath was covered with honey-dew. Spraying with a solution of any kind of soap, one pound to eight gallons of water, is the simplest treatment for plant lice.

It is stated on good authority that nearly 100,000,000 bushels of wheat and oats are destroyed annually by grain smuts, which could easily be prevented by the simple and inexpensive formaldehyde treatment of seed. The tiny spores of the smut-fungus cling to the grains and germinate with them in the soil. Formaldehyde prevents the germination of the spores but does not affect the seed.

A disease of narcissus which has been attributed to a species of *Fusarium*, a microscopic fungus, is now known to be due to a

nematode. The disease appears first in the neck of the bulbs, causing the leaves at and below the soil to decay and fall over. The nematode may pass from the diseased parent bulb to an offset but does not appear to pass from one bulb to another in storage. Rotation, trap-plants, heat, and spraying solutions are mentioned as preventative and remedial measures.

The output of lumber in the United States last year was about 36,000,000,000 feet, 10 per cent. less than the previous year. The decrease is said to be due to less building, scarcity of labor, transportation difficulties, etc. The state of Washington heads the list, with Louisiana second, Oregon third, and Mississippi fourth. Nearly half of the lumber cut was southern yellow pine, its nearest competitor being Douglas fir, while white pine and white oak together about equalled the output of Douglas fir.

The British Government has ordered 100,000 kapok waist-coats for its sailors. This "vegetable wool," derived from *Bombax malabaricum*, has been suggested as desirable also for our own sailors. Specimens of crude kapok, somewhat resembling cotton, may be seen on the main floor of the museum building. There are also specimens of an interesting wild species of *Bombax* from the limestone cliffs of western Cuba, the inner bark of which yields a valuable fiber. The outer bark of this tree is smooth and green and the bast tissue suggests that of our common linden.

In a recent bulletin of the Department of Agriculture, at Washington, some of the principal coniferous trees of the Rocky Mountains are described, with their habits, distribution, and value. The larches, hemlocks, incense cedars, western red cedars, and other important timber trees are discussed. The Douglas fir is the largest of all our western trees except the Sequoias, and it is adapted to an exceptionally wide range of conditions, from sea-level to 11,000 feet elevation, where it may become reduced to a tree only a few feet high. Some of the red cedars in the Rocky Mountain region are 1,000 years old, and some of the larches live to be 700 years old.

The importance of selecting a national flower at the present time, for patriotic and sentimental reasons, was strongly urged in a recent number of *Science* by Mr. Hansen, who believes that the wild columbine, *Aquilegia canadensis*, fulfills every necessary requirement, even down to its generic name. This flower was figured and described in the JOURNAL for August, 1912, as one of our wild plants needing protection, and, if it should be selected as our national flower, this need would be greatly increased. As Mr. Hansen says of the fringed gentian, Bryant little realized that his words of praise would speedily bring about the destruction of this beautiful gentian in many localities.

Meteorology for July.—The total precipitation for the month was 4.11 inches of which 3.15 inches fell during the day of the 30th and the night following. The maximum temperatures for each week were 88° on the 5th, 85° on the 10th, 96½° on the 21st, and *99° on the 22d.* The minimum temperatures were *50° on the 3d*, 53° on the 9th, 60° on the 16th, and 65° on the 26th.

ACCESSIONS

MUSEUMS AND HERBARIUM

10 specimens of hepaticae from Florida. (By exchange with Mr. Severin Rapp.)

1 specimen of *Campyloneuron angustifolium* from Florida. (Given by Mr. C. A. Mosier.)

80 specimens of *Rubus* from Vermont. (Distributed by Mr. W. H. Blanchard.)

1 cane from Greece. (Given by Mr. Charles Kohlman.)

1 specimen of *Centaurea maculosa* from Wisconsin. (By exchange with Professor A. L. Stone.)

5 specimens of *Rosa* from California. (By exchange with the Arnold Arboretum, Harvard University.)

1 specimen of *Aletris aurea* from Maryland. (Given by Mr. W. L. McAtee.)

6 specimens of *Morchella* from New York. (By exchange with Mr. Stewart H. Burnham.)

147 specimens of fungi from Porto Rico. (Collected by Professor F. L. Stevens.)

2 specimens of fungi from Massachusetts. (By exchange with Mr. Simon Davis.)

2 specimens of fungi from New York. (By exchange with Professor L. H. Pennington.)

14 specimens of fungi from New York. (By exchange with Dr. H. D. House.)

11 specimens of fungi from the Bahamas. (By exchange with Mr. L. J. K. Brace.)

1 specimen of fungus from New York. (By exchange with Professor H. M. Fitzpatrick.)

6 specimens of fungi from British Columbia. (By exchange with Mr. J. W. Eastham.)

1 specimen of fungus from California. (By exchange with Professor W. A. Setchell.)

2 specimens of fungi from Arkansas. (By exchange with Mr. John A. Elliott.)

1 specimen of fungus from Trinidad, West Indies. (By exchange with Professor J. H. Faull.)

1 specimen of fungus from Montana. (By exchange with Dr. J. R. Weir.)

2 specimens of fungi from Texas. (By exchange with Mr. F. W. Davis.)

15 specimens of fungi from California. (By exchange with Mr. H. E. Parks.)

50 specimens of fungi from Idaho. (By exchange with Mr. H. J. Rust.)

1 specimen of fungus from Texas. (By exchange with Professor J. J. Taubenhaus.)

1 specimen of fungus from Illinois. (By exchange with Mr. E. O. Lansing.)

1 specimen of fungus from New York. (By exchange with Mr. Herman Kahle, Jr.)

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EDITOR

FRANCIS W. PENNELL

Associate Curator

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A bunch of *Sphagnum papillosum* from a wet grassy swamp in Maine.

Prospecting for surgical sphagnum in the Maine bogs. The pool in the foreground is bordered by a luxuriant growth of *S. magellanicum*.

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THE SPHAGNUM MOSS AND ITS USE IN SURGICAL DRESSINGS*

"Are you collecting Sphagnum Moss?" Such was the question that appeared in bold type on the front cover of the London Graphic for September 2, 1916. From this journal we learn that the collecting and drying of sphagnum moss and making it up into surgical dressings "has become a national industry" in Scotland, and that "the work is being extended all over England, Ireland and Wales." Within the past two years the sphagnum industry has assumed large proportions in Canada, and in our own country it is rapidly coming to the front as an important phase of Red Cross work.

One very serious handicap to the sphagnum enterprise in this country is a lack of information regarding where to get material. Abundant supplies of good surgical moss have been located in the Pacific northwest, but the transportation of material from this region to the east presents an obvious problem. At the present time, therefore, we are scouring the east for sources of supply which can be drawn upon in case of need. What can you tell us regarding the sphagnum situation in your locality? Are there any good supplies of surgical sphagnum?

Now of course very few people are in a position to furnish off-hand the sort of information that we require. To perhaps most people the very identity of the sphagnum is veiled with mystery, and of those who may know it as a kind of "bog moss" few realize that there are a large number of different kinds. Even

* Contribution from the Osborn Botanical Laboratory.

among botanists, who of all people should know it best, there are comparatively few who can distinguish between one kind of sphagnum and another, or, what is more to the point in the present connection, who can discriminate intelligently between surgical and non-surgical material. In the account which follows, I shall discuss some of the more important facts regarding the sphagnum moss as related to surgical dressings. I shall try particularly to answer some of the many queries which are constantly being made by people who are eager to help in securing information regarding our resources of surgical sphagnum.

First of all, how did sphagnum come to be introduced into surgical practice? Who discovered its adaptability in this connection?

Along in the late seventies of the last century a workman at one of the great peat moors in northern Germany accidentally sustained a severe wound of the forearm. In the absence of anything better to use, his fellow workmen wrapped up the wound with fragments of the peat which happened to be lying near, and it was not until ten days later that the man was able to secure surgical attention. Imagine the surprise of the surgeon when, on removing the improvised dressing, it was found that the wound had almost completely healed.*

With this incident the use of sphagnum in present-day surgery may be said to have originated. As a matter of fact, however, its use in this connection is not a new thing at all: it is merely a modern and scientific revival of a very ancient practice. In parts of Great Britain, according to Professor Porter,† from time immemorial bog moss has been used by country people in the treatment of boils and discharging wounds. In Scotland and Ireland it was employed many centuries ago for exactly the same purpose that it is being used today; and moss was "at least recommended for use by army surgeons, both in the Napoleonic and the Franco-Prussian wars."

We must acknowledge our indebtedness to the Germans,

* This incident is related by Neuber (Arch. f. klin. Chir. **27**: 757 788. 1882), a German surgeon who at that time was connected with the surgical clinic at Kiel.

† Porter, J. B. Sphagnum surgical dressings. Internat. Journ. Surgery **30**: 129–135. *8 f. in text.* 1917. This comprehensive paper has been reprinted as a separate by the Canadian Red Cross.

however, for demonstrating the value of the sphagnum in the modern, antiseptic methods of surgery. Following the incident which I have related above, investigations were set on foot as to the nature and the properties both of the sphagnum and of the peat to which it gives rise, and a number of papers were published in German medical journals, in which the sphagnum, as related to surgical practice, was discussed from various points of view. And within a very few years this moss came to be accepted in Germany as a standard material for surgical dressings, being widely used not only in private practice but in some of the largest hospitals.

During the Russian-Japanese war, the Japanese used sphagnum quite extensively as a first-aid dressing. "Many of the wounds thus dressed with sphagnum were not inspected again until the patient reached Japan, which often took ten days, but almost invariably the wound was in good condition; much better it is said than when cotton was used."* In general, however, the value of sphagnum for use in surgical dressings has not been appreciated until quite recently.

To what extent is sphagnum being utilized in war hospital practice at the present time?

Shortly after the beginning of the war it began to be feared in England that there might be a shortage of cotton, and experiments were made with various materials—oakum, wood-pulp, and even sawdust—in the hope of finding some satisfactory substitute. † It was at this time that attention was directed to the neglected possibilities of the sphagnum.† In 1914, sphagnum dressings were given a thorough try-out at one of the large war hospitals in Scotland, and the results proved so satisfactory that sphagnum was at once recommended for general use. In September, 1915, sphagnum dressings were formally accepted by the British War Office. At that time the total British output of sphagnum surgical dressings was barely

* Hotson, J. W. Sphagnum as a surgical dressing. pp. 1–31. *f. 1–18.* Separate issued by the Northwest Division of the American Red Cross. Seattle. 1918.

† See especially a paper by Cathcart, C. W., and Balfour, I. B. in the Scotsman for November 17, 1914, and one by Cathcart in Brit. Med. Journ. 38: 137–139. 1915.

250 a month. A year later it had reached 150,000, and at the present time it is nearly a million. The Canadian Red Cross alone is now putting out between two and three hundred thousand sphagnum dressings each month.

In our own country the sphagnum enterprise, so far as the National Red Cross is concerned, is still in its infancy. But we have long since passed the stage of experimentation and have reached the stage where sphagnum dressings are being produced in considerable quantities. The American Red Cross has recently turned out half a million sphagnum dressings for the Italian army, and something over twenty thousand a month are now being made for American war hospitals. But the sphagnum work of the American Red Cross is not yet being conducted on the large scale which it is anticipated that it will be in the near future. For one thing, our American army surgeons, accustomed to the use of absorbent cotton and still having plenty of this on hand, hesitate about adopting a substitute. It is inevitable, however, that sooner or later the value of sphagnum in war hospital work will be more fully appreciated in this country: for the quality of the cotton is constantly becoming poorer, while the price is soaring higher. Moreover, wherever the sphagnum dressings have been tried out in our hospitals, they have given complete satisfaction.

For just what purpose is the sphagnum used in surgical work?

Sphagnum is used to replace cotton in absorbent surgical dressings—in what are known technically as absorbent pads, or compresses.

But, so long as there is plenty of cotton, why trouble with a substitute? And, if it is desirable to use a substitute, why select sphagnum rather than something else?

For use in absorbent surgical dressings sphagnum moss is not merely a satisfactory substitute. In many respects, without question, it is superior to absorbent cotton.*

First of all, sphagnum will absorb liquids much more rapidly than absorbent cotton—about three times as fast.

In the second place, the sphagnum will take up liquids in

* The following observations are taken mainly from Porter, *op. cit.*

much greater amount than absorbent cotton. A pad made of absorbent cotton will absorb only five or six times its weight of water. An average pad made of sphagnum will take up sixteen to eighteen times its weight of water, more than three times as much as cotton, and exceptionally good moss will absorb as much as twenty-two times its weight of water.

In the third place, the sphagnum will retain liquids much better than cotton. This means, of course, that a sphagnum dressing need not be changed as often as a cotton dressing.

In the fourth place, "the better qualities of sphagnum have the valuable property of distributing whatever liquid they absorb throughout their whole mass." An absorbent pad of sphagnum will continue to suck up fluid discharges until it is pretty uniformly saturated throughout. This is a very important feature. A cotton pad ordinarily ceases to function long before its theoretical capacity has been reached.

Now in ordinary hospital work, as Professor Porter points out, the comparative inferiority of cotton as an absorbent is not of any great consequence. Here, for the most part, the wounds are the result of operations and they are made by the surgeon himself. They are comparatively slight, and, what is particularly important, they are perfectly sterile. Discharging wounds are exceptional. But in war hospital practice every wound may be taken as infected. Discharging wounds are the rule, not the exception. Furthermore, "the methods of treatment recently so successfully developed by Carrel, Dakin, and others deliberately increase these discharges to a very great extent. For such cases . . sphagnum is greatly preferable to any other available material."

In this connection it might be mentioned that when it is dry, the sphagnum is very light, and many varieties are very fluffy. Sphagnum of the quality insisted on for surgical dressings is quite as soft as cotton.

Finally, there is one other point in which the sphagnum is distinctly superior to cotton; and this is a matter of great practical importance. Sphagnum is cheaper than cotton. Being a product of nature, pure and simple, all that you have to do is to

go and get it, and practically the only expense involved is the cost of collecting and transporting the material. As will be seen later, the process of preparing the sphagnum for use is very simple, and most of the work can be done by volunteer workers.

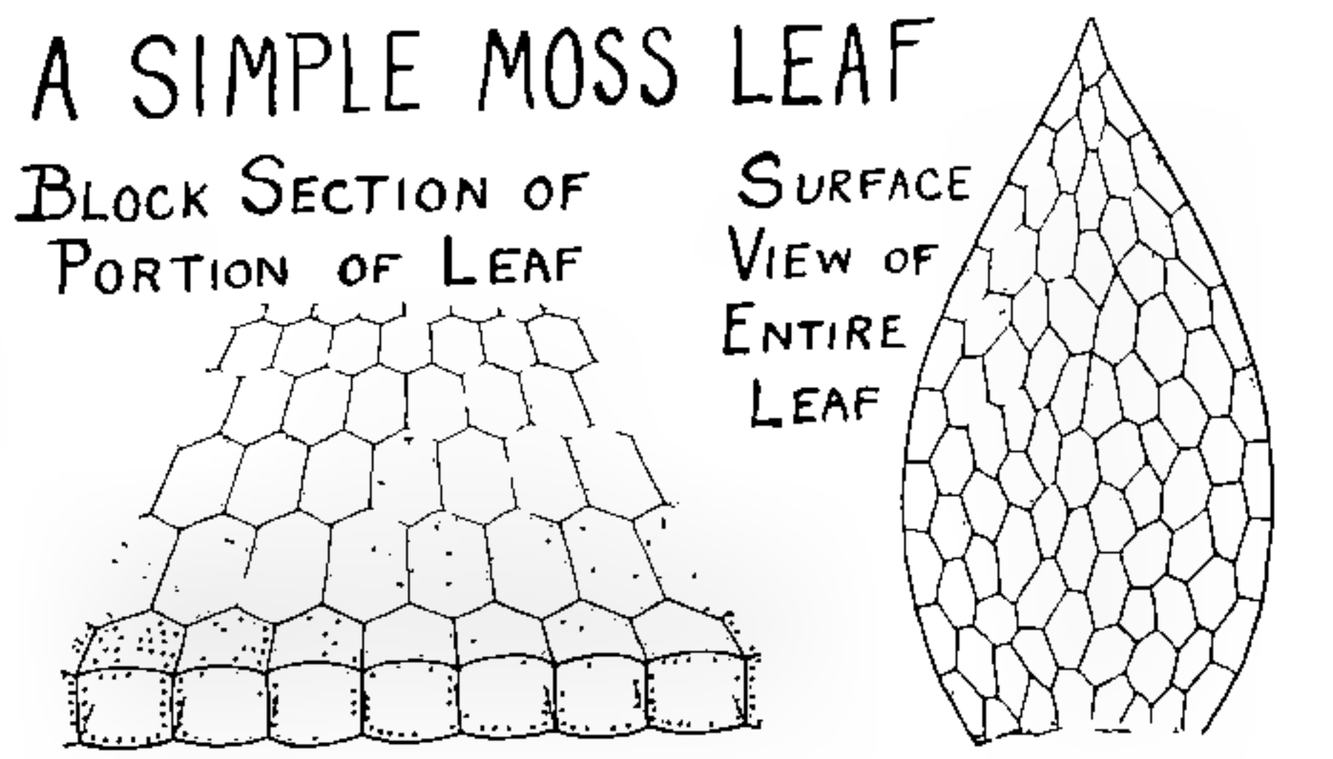
What does the sphagnum look like? How can you recognize it when you see it?

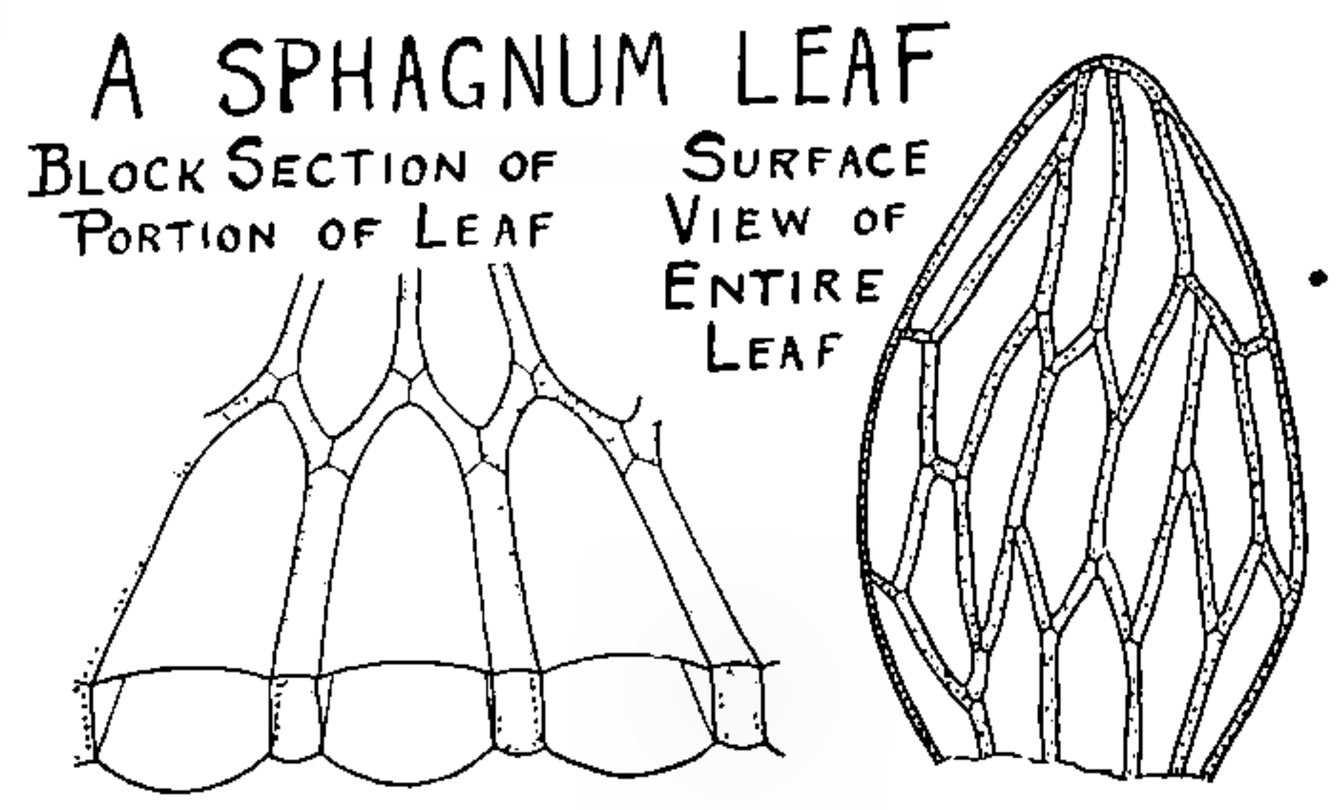
To begin with, the sphagnum is a sort of moss. But do not confuse the true mosses with the so-called "sea mosses." These are more correctly called sea-weeds: they are not mosses at all. The true mosses are comparatively small, leafy plants, seldom more than a few inches in height. They grow in all sorts of places: in dry, exposed crevices of rocks, on the bark of trees, on the ground in swamps and moist woods, and even in the water. But they never grow in salt water. To an ordinary observer, perhaps, the mosses are conspicuous chiefly on account of the great masses of vegetation which they commonly form. The sphagnums include some of our largest and most conspicuous mosses.

The sphagnum differs from other kinds of moss in a number of important respects.

First of all, a sphagnum plant seldom exhibits the deep leaf-green color of an ordinary moss. When wet, it commonly is a pale green; when dry, it may be almost white. Very frequently the green is hidden almost completely by pigments of various colors, so that the plants may be almost any shade from bright red and pink to russet green and dark brown or almost black. These colors form a very distinctive feature of many sphagnums when they are fresh. In nature, their mass effect is very striking, and they are of great help when it comes to recognizing material in the field.

But color alone is hardly a sufficient test. Other distinguishing marks are afforded by the peculiarities of the branches and of the leaves. If you examine a single sphagnum plant, you will see, first of all, that it consists of a main axis, on which are borne numerous short branches. Further, you will note that these branches are not borne singly, but in clusters of from three to six. No other moss produces its branches in clusters, after the

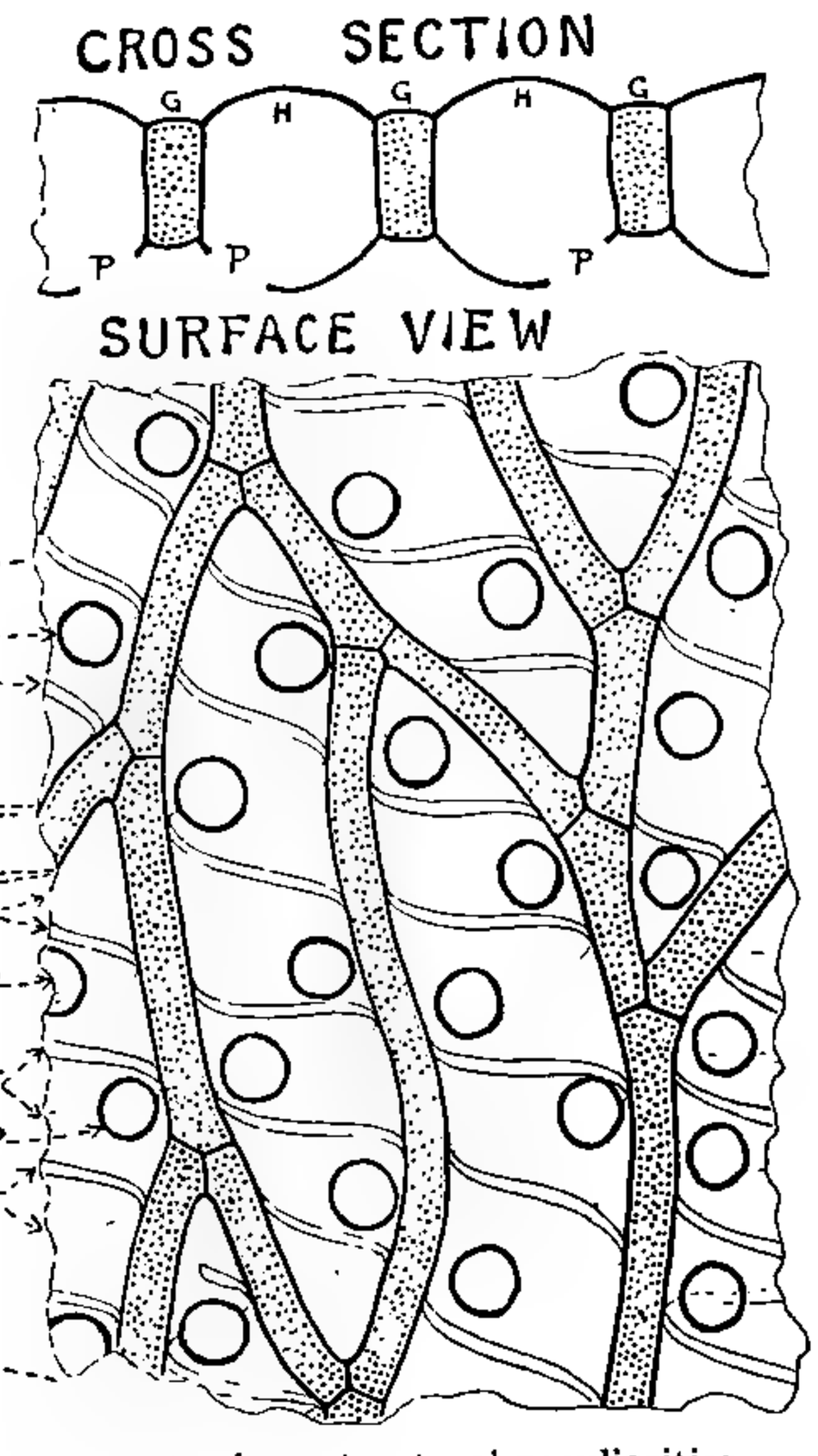




DIAGRAMMATIC SURFACE AND SECTIONAL VIEWS OF A SMALL PORTION OF A SPHAGNUM LEAF (HIGHLY MAGNIFIED)

H: LARGE, COLORLESS CELLS, DEAD, WITH OUTER WALLS PERFORATED (P = PORES), AND WITH SPIRAL BANDS OF THICKENING (T).

G: SMALL, GREEN CELLS, LIVING, AND FORMING A NETWORK WHICH ENMESHES THE COLORLESS CELLS.



...ves in an ordinary moss and in the sphagnum, as seen under a microscope, to show structural peculiarities.

manner of the sphagnum. Along most of the stem these branch clusters are scattered, but toward the tip they usually grow so close together as to form a rather compact rosette which sometimes is mistaken for a flower. It might be added that the branches in each cluster are of two sorts: one kind stands out at right angles to the main axis; the other kind droops down alongside the stem and forms a sort of loose, spongy matting around it.

And not only is the arrangement of the branches on the stem distinctive. Quite as striking is the arrangement of the leaves on the branches. Every branch is completely covered over by a series of tiny, more or less spoon-shaped leaves, which closely overlap one another, somewhat after the manner of shingles on the roof of a house.

To what structural peculiarities does the sphagnum owe its efficiency as an absorbent?

To a limited degree certain of the features already described adapt the sphagnum to absorb liquids: the close overlapping of the leaves around the branches, and the sponge-like matting of the pendent branches around the stem. But the real secret of the sphagnum's efficiency as an absorbent lies in the remarkable microscopic structure of its leaves.

Before discussing the somewhat complicated sphagnum leaf, I will describe briefly the much simpler structure of an ordinary moss leaf, as it looks under the microscope. Such a leaf consists of a single layer of tiny microscopic cells. Seen in surface view the individual cells are polygonal in outline, but in reality, considered as solids, they are prismatic in shape. All of the cells in the leaf are essentially similar to one another: without exception they are green and living and they are all of approximately the same size and shape.

But in a sphagnum leaf the structure is much more complex. Here also there is just a single layer of cells, but these cells are of two totally different kinds. First, as in the ordinary moss leaf, there are the green, living cells. But these green cells, in the sphagnum leaf, are very small and very much elongated, and they are arranged to form a sort of open network which runs all through the leaf. In the meshes of this network occurs the

second kind of cell. These cells are large, without color, dead and perfectly empty. It is to the presence of these large, colorless cells and to their remarkable structure, which I shall describe next, that the sphagnum owes its wonderful power to take up liquids.

Now, to a certain extent, the cells of any moss leaf are able to absorb liquids. But the ability of the ordinary green cells in this respect is insignificant when compared with that of the large, colorless cells of the sphagnum leaf. These, because of their capacity for absorption, may well be referred to as the *absorbing cells*. There are two features in these cells which especially adapt them to the function of absorption. First, the wall of each and every one of the absorbing cells is punctured toward the outside by several minute holes or pores. It is through these pores that liquids are sucked into the cells. Each cell, acting independently, sucks in whatever liquid it comes in contact with until it is full. A sphagnum plant with its hundreds of leaves, each leaf containing hundreds of these tiny absorbing cells, represents a highly efficient absorbing system. And this absorptive ability is not confined to plants that are fresh. A dry, dead leaf is just as efficient, when it comes to taking up liquids, as a fresh one. This is due to the second structural peculiarity of the absorbing cells. For inside of each one of these cells there is a spiral, spring-like coil of thickening (or commonly a series of hoop-like ribs of thickening) which presses outward, as it were. against the walls of the cell and serves to keep it from collapsing. Even after a leaf has become completely dried out, this "framework" serves to keep the cell cavity open.

Incidentally, while it is the leaves which are most efficient in the absorption of liquids, in some varieties of sphagnum both the stem and branches are enveloped by one or more layers of absorbing cells, essentially similar to those found in the leaves.

It now becomes perfectly clear why it is that sphagnum is so much superior to cotton as an absorbent. In cotton liquids, for the most part, are merely held within a tangle of threads. In the sphagnum we find a highly specialized absorbing system, made up primarily of a vast series of absorbing cells, but supple-

mented to a high degree by various other structural peculiarities of the sphagnum plant.

How can surgical and non-surgical varieties of sphagnum be distinguished from one another?

Just as there are a great many different varieties of roses and chrysanthemums and dahlias, so there are a great many different kinds of sphagnum; and these different kinds are by no means of equal value for surgical purposes. Some of them, indeed, are worse than useless. A great deal of the dissatisfaction with sphagnum dressings which was expressed by army surgeons in the early days of the sphagnum enterprise can be attributed to the failure to appreciate this difference, and to the indiscriminate use of any and all species of sphagnum in making up the dressings.

In the little state of Connecticut alone there are no less than twenty-five different kinds of sphagnum; on the continent of North America there are at least forty. Of these forty species only two or three are actually used to any extent for surgical purposes. It is not enough, then, to know that a sphagnum is a sphagnum. One must be able to differentiate between suitable and unsuitable varieties.

Now, from a botanical point of view, the sphagnums are an exceedingly difficult group of plants to work with. It is a job for an expert to properly identify specimens: in fact, it is a job which very few botanists feel qualified to undertake. Fortunately, however, the recognition of material suitable or otherwise for surgical purposes is much less difficult. With a little training and experience it is well within the ability of almost anyone to at least distinguish with some degree of certainty between sphagnum which very likely will prove of surgical value and sphagnum which quite certainly will not.

Without going too much into detail, then, we will consider next just what qualities are desirable in sphagnum material which is to be used in surgical dressings.

First of all, the highest possible capacity for absorbing liquids is essential; and with reference to this qualification there is a wide range of variation between different species. In general, the more robust varieties of sphagnum are better than the more

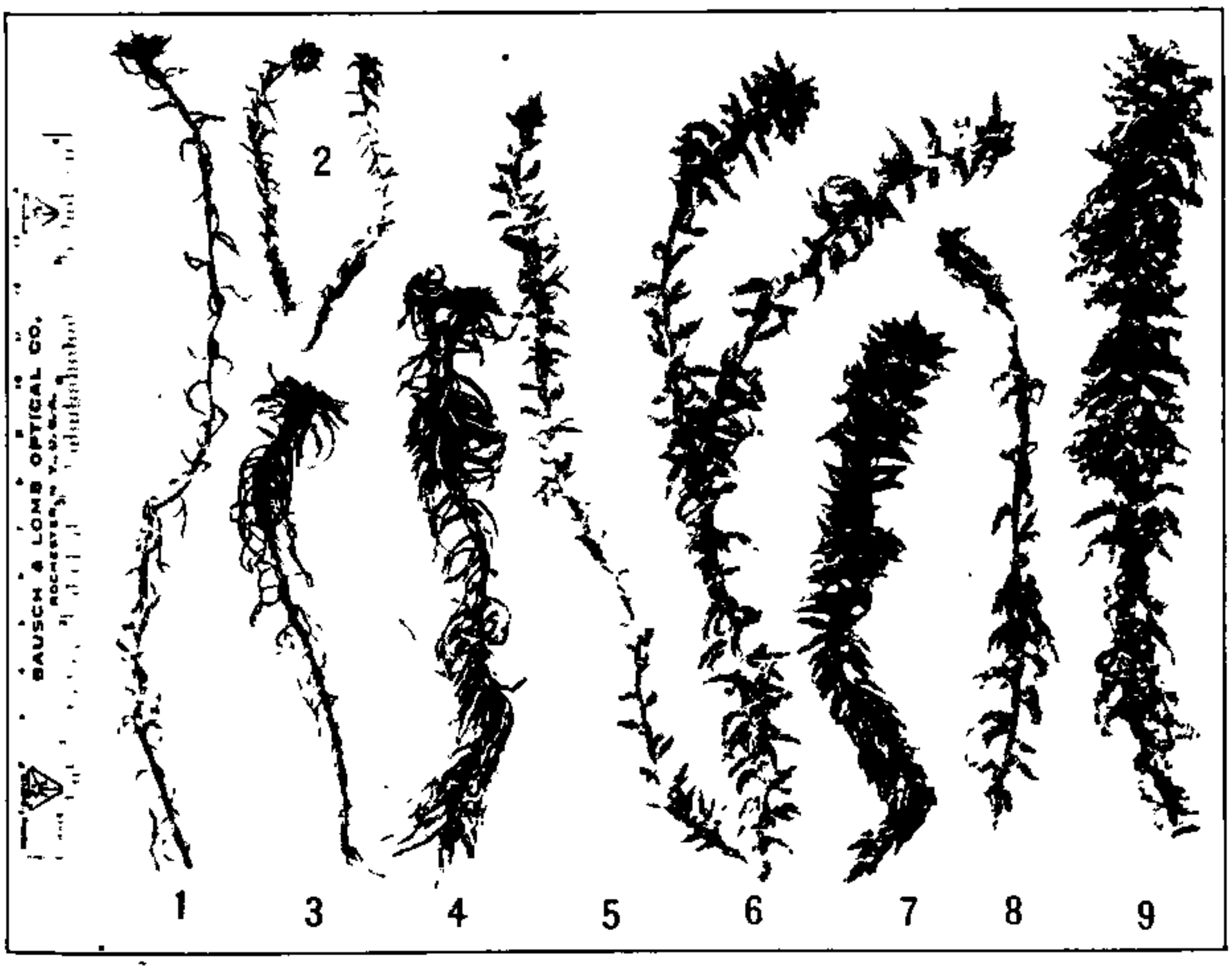
delicate; forms with large leaves, dense foliage, and close-set branches are much better than varieties with small leaves, skimpy foliage, and scattered branches. In the second place, it is essential that the material should be soft and flexible, and at the same time that it should possess a considerable degree of strength. Here again there is great variation between different species. In general, coarse or stringy forms, or forms with stiff or brittle stems or harsh texture, must be avoided.

Of all the sphagnums, there is one species which combines, to a greater degree than any other, absorbency, softness, and strength. This is *Sphagnum papillosum*. This species, at least here in the east, has been found to be much more satisfactory for use in surgical dressings than any other variety. Three other species of sphagnum have been used to a considerable extent in surgical work, namely *S. palustre*, *S. magellanicum*, and *S. imbricatum;* but while in the humid climate of western Washington and British Columbia these develop quite as luxuriantly as *S. papillosum*, and while locally, here in the east, they may compare very favorably, on the whole they tend to have too much stem in proportion to foliage or too harsh a texture to make ideal surgical material. In the field *S. papillosum* can usually be recognized by its very robust habit and brownish color: it is never red or purple. As a rule the other three species named are less robust; *S. magellanicum* commonly is pink or purplish red in color, *S. palustre* pale greenish white, and *S. imbricatum* green.

In this connection it should be emphasized not only that different varieties of sphagnum exhibit a wide range of variation when it comes to their capacity for absorbing liquids, as well as to other features which adapt them to surgical use,

PLATE 218, lower figure. 1. *Sphagnum recurvum*. 2. *S. capillaceum tenellum*. 3. *S. Girgensohnii*. These three and similar forms are mostly worthless for surgical work. 4. *S. plumulosum flavicomans*. This species is sometimes used for surgical dressings. 5, 6, 7. *S. magellanicum*. Material like No. 7, which is soft and very full-foliaged, and No. 6, which is less bushy but very soft, make excellent surgical material. These specimens grew in the water. No. 5 illustrates the usual habit of this species very stemmy, sparsely branched, and rather harsh. Such material is useless. 8, 9. *S. papillosum*. These two specimens and Nos. 6–8 illustrate the range of variation exhibited by the same species under different conditions of environment. Moss like Nos. 7 and 9 furnishes the best surgical material.

Picking over sphagnum at McGill University, Montreal. An open sack of raw moss in left foreground. Photograph supplied by Professor John Bonsall Porter.



Forms of sphagnum suitable and otherwise for surgical dressings. For explanation see opposite page.

but also that the very same species may vary greatly in different localities. Growing under certain conditions it may acquire that soft, "bushy" habit so desirable in material which is to be used for surgical dressings, while growing under other conditions it will be harsh, stringy, and quite unfit for surgical purposes. Even *Sphagnum papillosum* exhibits considerable variation in this respect. And this brings up another question.

Where does the sphagnum grow? In what kinds of habitats does it occur, and in what sections of the country does it develop best?

When it comes to locating sources of supply for surgical sphagnum, obviously it is not enough to be able merely to recognize the sphagnum when you see it. It is not even enough to be able to distinguish surgical from non-surgical material. It is every bit as important to know in what sort of places to look for it, and also what sort of places to steer clear of.

In general, the sphagnums grow in wet places. Taken as a class they are moisture-loving plants. Considering them from a geographical point of view, it can be said that they grow best in regions where the climate is moist the year round, but especially in summer, and where the summers are not too hot. They attain their best development in cool, humid regions, such as Newfoundland, Nova Scotia and New Brunswick, Vancouver Island and western Washington. On the whole, they develop most luxuriantly near the seacoast, particularly along coasts where fogs are frequent. They are better developed northward than southward. This is especially true of *Sphagnum papillosum*, which has never been found at all south of New Jersey. In the northern regions that I have just mentioned the sphagnums are very widely distributed, occurring not only in swamps but to a considerable extent on uplands as well. Farther south, in regions where the climate is drier and the summers hotter, they are mostly confined to swamps.

Now in this connection, there is one particular type of swamp that I want to call attention to, and that is the kind of swamp known as a *bog*. It is in bogs that the sphagnums develop most luxuriantly. Let us consider first the conditions which prevail in southern New England, a region in which the bog type is in

striking contrast to other types of swamp. The conditions here are essentially similar to those that prevail throughout our northern states and to a considerable extent in Canada.

The plant-population of all bogs, no matter in what section of the country they occur, is very much alike. In fact, this is so much the case that a bog can usually be recognized from the character of its vegetation alone. Especially striking is the bushy element in the vegetation. Almost invariably this is made up very largely of members of the Heath Family: such plants as the bog laurel and bog rosemary, the cassandra, the Labrador tea, and the cranberries. These are mostly absent from swamps of the ordinary description. In eastern Maine a bog is commonly referred to as a *heath*, although in Maine this word, which in Europe is commonly used with reference to similar areas, has been yanke ized to "haythe." In Europe a bog is also called a *moor*.

The characteristic tree in bogs is the black spruce. Farther north, as in Maine and the Adirondacks, this tree is by no means confined o bogs, but in southern New England it almost never grows anywhere else. Such trees as the elm and the ash, which are common in ordinary swamps, are conspicuously absent from bogs. Bogs are also the home of such bizarre forms as the pitcher plant and the sundews, plants which possess the insect-catching habit. But from our point of view the outstanding feature of a bog is the wonderful development of the sphagnums. Almost invariably they constitute one of the most prominent elements in the vegetation.

To a certain extent the sphagnums may grow in almost any wet, springy swamp, whether it is open or wooded. But in swamps which are situated along rivers, where the ground is flooded from time to time with muddy water, they are not apt to occur in any profusion. Even farther north, in regions like New Brunswick and Nova Scotia, where climatic conditions are most congenial to their development and where they are much more generally distributed than farther south, the sphagnums grow best in the bogs. So abundant as a rule are the sphagnums in this particular type of swamp that many bogs are popularly referred to as *moss bogs*.

A few words in passing regarding the nature and origin of these bogs. Bogs are perhaps most widely known on account of the deposits of *peat* by which they are commonly underlain. Peat is partly decayed vegetable matter, usually deposited under water. It represents an intermediate condition between dead plants and coal. Coal is essentially petrified peat. In parts of northern Europe peat is one of the chief sources of fuel, and our own peat deposits have been under investigation by the government for a number of years.

In our region the areas which today are occupied by bogs, almost without exception, were formerly occupied by lakes or ponds. A pond may become filled in and converted into a bog wholly through plant activity. You can find every stage between ponds in which scarcely any filling has taken place and ponds which have given way completely to bogs. Very commonly the filling in is brought about through the agency of what is known as a *floating mat*. The vegetation along the edge of the pond grows so vigorously that it spreads away from the shore, out over the open water. In this way there is developed what is commonly referred to as a *quaking bog*. This raft of vegetation, floating on the surface, rising and falling with fluctuations in the water level, may be underlain by clear water or by soft, bottomless ooze. So firm, however, may the mat become that while the surface trembles and quakes when you walk over it, nevertheless it is quite capable of supporting the weight of a man. A quaking bog is an ideal place to look for surgical sphagnum.

In most sections of the United States, bogs are rather rare in their occurrence and they are rather small in size. In cool humid regions, such as Newfoundland, Nova Scotia, and eastern New Brunswick, they are much commoner and frequently cover extensive tracts of country. In these northern regions, in addition to the ordinary type of bog, there is found a remarkable type known as a *raised bog*. Unlike our ordinary bogs, the surface of a raised bog is domed up, just like an inverted saucer. It may be fifteen or twenty feet higher toward the center than it is around the edges. Bogs of this sort are found only in regions where the

climate is exceptionally favorable to the development of the sphagnums. They are built up almost wholly by the sphagnum, and they can develop only in regions where there is sufficient rain and fog to permit the sphagnum to grow up above the water level.

Now the facts regarding raised bogs that I have just pointed out have a rather important application. If, as I have said, these raised bogs are restricted to regions where climatic conditions are most favorable to sphagnum development, it follows that you ought to find your best sphagnum in regions where these raised bogs are present. In other words, you can regard the abundance of raised bogs in any region as a sort of barometer as to the degree to which the climate there is suited to the sphagnums.

I have spent a month this past summer investigating the sphagnum situation along the Maine coast. Starting in at Portland, I have visited fifteen different localities between there and Calais, which lies along the Canadian border. In the vicinity of Portland there are no raised bogs, and I was unable to find any trace of surgical sphagnum. As you travel eastward the raised bogs become more and more common, and surgical sphagnum, at first very local in its occurrence, becomes more and more general in its distribution. There seems to be little question that the coastal region of Maine, from Penobscot Bay eastward, is the most promising part of the eastern United States in which to look for supplies of surgical sphagnum. Unfortunately, however, many of the very best bogs—the ones most suited to the growth of surgical sphagnum, and the ones easiest to get at—lie along the borders of small lakes; and these lakes for years have been dammed by the lumbermen and the bogs flooded to such an extent that most of the best sphagnum has been drowned out. In other places fires have exterminated or killed back the sphagnum over large areas. *Sphagnum papillosum*, the most desirable species for surgical purposes, is extremely sensitive to any change in external conditions. In spite of these difficulties, however, I was able to locate a considerable number of sizeable tracts of good moss; and I have no doubt that others will continue to turn up.

But Maine is not the only part of the east where surgical sphagnum occurs. It may grow in almost any bog. You can only tell by looking. As I stated earlier, American army surgeons at the present time are not using sphagnum to anywhere near the extent that it is being used by surgeons in the other allied armies. But it is our business to be prepared; and to this end we want information regarding every locality which might possibly be utilized as a source of supply for surgical sphagnum. It may be that some of you know the whereabouts of a promising bog. If you do, look it over; and if you find any quantity of what looks like good material, send us a sample of it.*

In surveying any district for surgical sphagnum, there are a few practical points which it is well to bear in mind. A wooded bog may contain plenty of sphagnum, but for our purpose it is rarely of any value. The good moss almost invariably grows in open bogs. Again, an open bog all overgrown with bushes, where the sphagnum forms great soft cushions a foot or so high, is apt to afford pretty poor picking. There may be plenty of moss, but most of it will prove to be of the wrong variety; or if it is of the right variety it will be of poor quality. For that matter, it should be said that in almost any bog there is sure to be a large proportion of undesirable material. Commonly the bulk of the sphagnum will consist of species that are of no use at all for surgical purposes.

The best qualities of moss always grow in the wettest parts of a bog. A dry bog is apt to contain no material whatever of surgical value. A wet one may be full of it. The best kind of a bog for surgical moss is a wet cranberry bog: not one of the artificial variety that is so common in southern New Jersey, but one where the cranberries grow scattered over a soft carpet of moss, intermixed with more or less "cranberry grass" (*Carex filiformis* and *C. oligosperma*) and perhaps a scanty growth of low bushes. It is in bogs of this description that I have seen the best material in Maine. In exploring any bog for surgical sphagnum, always look for the wettest places: the soft, quaky spots around the edges

* Specimens of material may be sent to the writer at Yale University, New Haven, Conn.

of ponds, the small depressions, and the wet furrows; and steer clear of the bushy places.

In this connection, there is one other important point to be borne in mind, and that is transportation facilities. Any tract of moss, to be of practical value, must be reasonably accessible. It is hardly worth while paying any attention at all to bogs that are situated away off where it will be practically impossible to get material out, even if it is there.

Finally, how is the material collected and prepared for use, and what are the sphagnum dressings themselves like?

The method of collecting and preparing sphagnum for use in surgical dressings, as outlined in Professor Porter's Instruction leaflet,* is essentially as follows. For collecting the stuff old oat or potato sacks are used. These are first thoroughly cleaned and boiled. A carefully filled sack is about as much as a man can conveniently handle, particularly where, as is usually the case, there is a considerable stretch of soft, boggy footing between the collecting ground and terra firma. Collecting the moss is not always easy work. In many places the conditions are such that only men can do it, but in other places women and even children can be employed. Under proper guidance, however, this part of the work can very well be performed by laborers. Very likely boy scouts could be used to advantage.

The detailed steps in collecting are somewhat as follows. After selecting a place where the material is as good and as clean as possible, the collector seizes a double handful of the moss, grasping it as low down as possible, and pulls it up bodily. He then squeezes the wet, spongy mass to get rid of the bulk of the water, pulls out any coarse plants that may be present, removes any muck or decayed matter from the bottom, and places the material in a sack. This operation is repeated until the collector has either exhausted the supply or obtained as much as he can handle.

The next step in the process is the drying and sorting. From the bog the sacks of moss are carted to some place where the

* Instructions for the collection and preparation of sphagnum moss for surgical purposes. pp. 1 7. Canadian Red Cross, Montreal. 1917.

material can be spread out to dry. The drying can be accomplished by spreading out the moss on a clean lawn or on the floor of a barn or attic where there is a good circulation of air. But where large quantities of material are to be handled, it is customary to use drying racks of some sort. Drying by means of artificial heat is avoided, so far as possible, since material thus prepared is much more brittle than material that has been air-dried.

The only further treatment the moss requires before it is ready to be made up into dressings is sorting over. This is preferably done before the material has become thoroughly dried out, since the moss when dry is more or less brittle and less easy to handle than when moist. All foreign material is carefully pulled out by hand, and at the same time the moss is separated into two or more grades: first class material suitable for dressings, second class material suitable for bed pads, etc. This part of the work, indeed everything except the collection and hauling of material, is done by women. In Canada, moss sorting is one of the most popular phases of Red Cross work among the volunteer workers.

In conclusion, just a word regarding the nature of the absorbent dressings which are made from the sphagnum. The simplest type is merely a bag filled with the moss and then sewed up. This type has been extensively turned out by the Canadian and the British Red Cross and to some extent by the American Red Cross. The bag is made of light-weight muslin, this being used in preference to gauze, which is too light and of too open a texture to use in this style of dressing. This particular type of dressing has several disadvantages. The sphagnum has a tendency to slide around and to bunch up, and the dressing wets through to the back very quickly. Moreover, for various reasons the muslin is inferior to gauze or cheesecloth, such as is used in absorbent cotton pads, and it is objected to by surgeons.

This style of dressing has been greatly improved upon within the last year, and a type of pad has been devised which seems to overcome all of the objections that I have just mentioned. These pads are constructed somewhat as follows. In making the pad, first of all a layer of cheap non-absorbent cotton, the size of

the dressing, is laid down. Over this is spread a layer of sphagnum. The cotton backing gives shape to the pad, and it serves to hold the sphagnum in place and to prevent it from slipping around. But in addition to this, being non-absorbent, it prevents the pad from becoming too rapidly soaked through to the back. Over the sphagnum is then spread a double layer of very thin gauze paper, the so-called Scott paper tissue. This is folded under at the edges to form a sort of envelope for the sphagnum. This gauze paper does not affect in the least the absorbing capacity of the pad, but it does serve to prevent fine particles of sphagnum from working through the cloth covering and irritating the wounds, and it therefore makes it possible to use gauze for the outer wrapping of the dressing. Pads of this type are more complicated than those composed entirely of sphagnum, and they are somewhat more expensive. But they are quite easily made, and they are cheaper and at the same time much more absorbent than the ordinary cotton pads.

Sphagnum dressings, however made, are decidedly bulky. In order to flatten them out and to economize space in packing, it is customary to run them through a clothes wringer. After this treatment the dressings are ready to be sent to the hospitals, where they are sterilized shortly before being used. Sometimes, however, for emergency use in field hospitals, etc., the dressings are sterilized before being sent out by being dipped in an antiseptic solution.

GEORGE E. NICHOLS

SHEFFIELD SCIENTIFIC SCHOOL,
YALE UNIVERSITY

BYRON DAVID HALSTED

Professor Halsted died at his home in New Brunswick, New Jersey, on August 28, 1918, after a protracted illness. He had occupied the Chair of Botany in Rutgers College for nearly thirty years and had previously been professor in the Iowa State University.

Professor Halsted has served as a member of the Advisory Board of "*North American Flora*," published by the New York Botanical Garden, since the commencement of that work in 1905, and during the several years preceding, while it was in the organization stage, he was an active member of the group of American botanists who made the enterprise possible. He has been President of the Society for the Improvement of Agricultural Science and of the Botanical Society of America, edited the American Agriculturist for a period, and has also been one of the editors of the Torrey Botanical Club.

He was a highly successful and greatly beloved teacher and investigator of renown. His most important publications have been in the fields of agricultural botany and plant diseases, and they include over 300 titles. His loss is a deep personal bereavement to his many friends and professional associates.

N. L. BRITTON

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

Continued)

Pourthiaea. POURTHIAEA

Pourthiaea villosa. JAPANESE POURTHIAEA.
Location: Fruticetum.
Natural distribution: Japan and China.

Amelanchier. SERVICE-BERRY

Amelanchier asiatica. JAPANESE SERVICE-BERRY.
Location: Fruticetum.
Natural distribution: Japan and Corea.
Amelanchier canadensis. JUNE-BERRY.
Location: Fruticetum.
Natural distribution: Eastern North America.
Amelanchier intermedia. SHAD-BUSH.
Location: Fruticetum.
Natural distribution: Eastern United States.
Amelanchier sanguinea. ROUND-LEAVED JUNE-BERRY.
Location: Fruticetum.
Natural distribution: Northeastern North America.
Amelanchier spicata. LOW JUNE-BERRY.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Crataegus. THORN

Some of the species have not produced flowers: such have been listed by the names under which they were received.
Crataegus acclivis. HILLSIDE THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus albicans. TATNALL'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.
Crataegus alnorum. EDSON'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Crataegus aprica. SUN THORN.
Location: Fruticetum.
Natural distribution: Southeastern United States.
Crataegus Arnoldiana. ARNOLD'S THORN.
Location: Fruticetum. Arboretum.
Natural distribution: Eastern Massachusetts and Connecticut.
Crataegus aspera. ROUGH-LEAVED THORN.
Location: Fruticetum.
Natural distribution: Missouri.
Crataegus barbara. SLAVIN'S THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus Barryana. BARRY'S THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus Bartramiana. BARTRAM'S THORN.
Location: Arboretum.
Natural distribution: Eastern Pennsylvania.
Crataegus Baxteri. BAXTER'S THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus Boyntonii. BOYNTON'S THORN.
Location: Fruticetum.
Natural distribution: Eastern United States.
Crataegus Brainerdi. BRAINERD'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.
Crataegus Brainerdi var. **Egglestoni.** EGGLESTON'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern North America.
Crataegus Brittonii. BRITTON'S THORN.
Location: Fruticetum.
Natural distribution: Southern Alleghenies.
Crataegus calpodendron. PEAR THORN.
Location: Fruticetum.
Natural distribution: Eastern United States.
Crataegus champlainensis. LAKE CHAMPLAIN THORN.
Location: Fruticetum.
Natural distribution: Region of St. Lawrence.

Crataegus chrysocarpa. ROUND-LEAVED THORN.
Location: Fruticetum.
Natural distribution: Northern North America.

Crataegus coccinea. SCARLET THORN.
Location: Fruticetum. Arboretum.
Natural distribution: Northeastern United States and Ontario.

Crataegus coccinioides. EGGERT'S THORN.
Location: Fruticetum.
Natural distribution: Eastern United States.

Crataegus collina. CHAPMAN'S HILL THORN.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Crataegus comans. ADORNED THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus contigua. STRAIGHT-BRANCHED THORN.
Location; Fruticetum.
Natural distribution: Vermont.

Crataegus Crus-galli. COCKSPUR THORN.
Location: Fruticetum. Arboretum.
Natural distribution: Eastern United States.

Crataegus cuneiformis. MARSHALL'S THORN.
Location: Arboretum.
Natural distribution: East central United States.

Crataegus denaria. PALMER'S THORN.
Location: Fruticetum.
Natural distribution: South central United States.

Crataegus disjuncta. MISSOURI THORN.
Location: Arboretum.
Natural distribution: South central United States.

Crataegus dispessa. BUSH'S THORN.
Location: Arboretum.
Natural distribution: Missouri.

Crataegus Dunbari. DUNBAR'S THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus durobrivensis. ROCHESTER THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus exigua. CONNECTICUT THORN.
Location: Arboretum.
Natural distribution: Connecticut.
Crataegus ferox. VICIOUS THORN.
Location: Fruticetum.
Natural distribution: Missouri.
Crataegus ferentaria. SOLDIER'S THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus formosa. BEAUTIFUL THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus globosa. GLOBE-FRUITED THORN.
Location: Fruticetum.
Natural distribution: Missouri and Kansas.
Crataegus gloriosa. GLORIOUS THORN.
Location: Fruticetum.
Natural distribution: New York.
Crataegus gravis. FRUITFUL THORN.
Location: Fruticetum.
Natural distribution: Michigan.
Crataegus Harbisoni. HARBISON'S THORN.
Location: Fruticetum.
Natural distribution: Tennessee.
Crataegus insolens. AGGRESSIVE THORN.
Location: Fruticetum.
Natural distribution: Vermont.
Crataegus insueta. STRANGE THORN.
Location: Fruticetum.
Natural distribution: Pennsylvania.
Crataegus intricata. LANGE'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.

NOTES, NEWS AND COMMENT

Professor F. S. Earle, formerly a member of the Garden staff, about the middle of August spent some days at the Garden and then sailed for Porto Rico, where he is to investigate for the United States Government a serious and rather obscure disease of sugarcane.

The following botanists have recently registered in the library: Drs. Charles Thom and A. S. Hitchcock, Washington, D. C.; Professors A. H. Graves and A. W. Evans, New Haven, Conn.; Bishop Cameron Mann, Orlando, Fla.; Professor W. C. Coker, Chapel Hill, N. C.; E. D. Eddy, Bangor, Me.; W. H. Blanchard, Montpelier, Vt., and Professor Frederick A. Wolf, West Raleigh, N. C.

Dr. F. C. Stewart, in Bulletin 448 of the New York Agricultural Experiment Station, fully describes and beautifully illustrates the appearance and habits of *Collybia velutipes*, an edible fungus remarkable for its ability to withstand cold. Dr. Stewart believes that it should be better known and more generally used for food, and he intimates that it may be possible to cultivate it.

The Report of the State Botanist of New York for 1916, by Dr. H. D. House, formerly a student at the Garden, contains a number of articles of interest to botanists in general. In addition to the usual list of accessions and local flora notes, there is a long list of species of lower fungi, either new or interesting, and a list of the flowering plants and ferns of the Oneida Lake region. One of the most interesting parts of this report is an ecological treatment of the vegetation of the eastern end of Oneida Lake, and which is illustrated with very handsome photographs.

Dr. Britton's "Flora of the American Virgin Islands," published in the first volume of *Annals of the Brooklyn Botanic Garden*, has been reprinted and issued separately as *Contributions from the New York Botanical Garden*, No. 203. It is the first

natural science document issued relative to the islands St. Thomas, St. Jan and St. Croix since they were purchased from Denmark. It consists mainly of a list of the plants, native, naturalized or cultivated, known to inhabit the three islands, prefaced by an account of their topography, the history of their botanical exploration, and a botanical bibliography. The list of Mosses is by Mrs. Britton, that of hepatics by Professor Alexander W. Evans, of Yale University, and that of Lichens by Professor Lincoln W. Riddle, of Wellesley College; there is a bibliography of the algology of the islands by Dr. Marshall A. Howe, and some notes upon such fungi as are known.

In the Botanical Garden this year thrushes have been quite plentiful—even two Bicknell thrushes have been seen. The wood duck which last year raised two young, this season had a family of nine, all of which survived. A rose-breasted grosbeak remained through the summer, and two chats were seen in migration. A merganser was a novelty.

A series of photographs of rare specimens representing studies in the family Annonaceae by Mr. W. E. Safford has recently been added to the herbarium.

Specimens of *Globifomes graveolens* were recently collected by Professor A. H. Graves on a living red oak trunk near New Dorp, Staten Island and sent to the Garden herbarium. This very curious and interesting tree-destroying fungus was first described from Georgia by Schweinitz and is of rare occurrence on oak, beech, and maple as far north as Pennsylvania and as far west as Iowa. This is the first time it has been found within the local flora range.

Farmers' Bulletin number 940 recently issued by the Department of Agriculture is devoted to the "Common White Grubs," insects which are very destructive and which were epidemic in the Garden a few years ago. The Bulletin contains full description of the life history, distribution and habits of the insects with suggestions as to the best methods of control. Since this pest

is likely to recur at intervals the information contained in this publication will be valuable to any who are interested in gardening.

To develop varieties of wheat which will resist black rust, the United States Department of Agriculture is working in coöperation with the state experiment stations of Minnesota, Kansas, Tennessee, and Iowa. In the hope of obtaining rust resistant strains of the best grade durum wheats and other immune varieties are being crossed on varieties known chiefly for their milling and bread-making qualities. Extensive milling and baking experiments already have been made with a number of these hybrids.

Linen cloth is now being used to some extent for tagging plants. Writing on wooden tags soon becomes illegible, while copper tags are not only expensive but are not large enough for sufficient data. The linen tags are first soaked several days in water to remove the sizings and then dried and smoothed with a hot flatiron. Data are written with India ink, using a round-pointed pen. The ink soaks in but does not run. Such tags will last a year or longer. When they are to be used for longer periods or under conditions where the tags come in contact with the ground, they are coated with paraffin after labeling. One method is to dip them in a mixture of gasoline and paraffin (proportion, 1 quart of gasoline to one-half pound paraffin). The gasoline evaporates, leaving a film of paraffin. If the tags become coated with mud, they can easily be washed and the ink shows up clearly. Such tags may be used in a variety of ways, for when treated in this manner they last exceptionally well.

The campaign to eradicate the common barberry, which was started by the United States Department of Agriculture last spring, has already met with gratifying results. The common barberry harbors the black rust of wheat, oats, barley, and rye, a disease which causes enormous losses in this country. In certain European countries it has been demonstrated that the eradication of the barberry has resulted in a marked decrease in the amount of damage caused by this disease. In central and

northwestern states where the campaign is being conducted, public sentiment has been aroused. Nurserymen for the most part have agreed to discontinue distributing common barberry bushes. Park boards in many cities have eradicated them. State nursery inspectors and state entomologists are destroying the bushes wherever stem rust infection is found. Several state councils of defense have issued appeals for the eradication of this barberry, and the public safety commission of Minnesota has issued an order providing for compulsory eradication in that state. The Japanese barberry does not come under the ban, as it does not harbor the rust.

The Department of Agriculture has undertaken to assist the War Department in obtaining the large quantities of walnut timber needed for gunstock and airplane propeller material. The demand is far beyond what can be supplied through the usual channels of trade. Appeal is being made to all owners who can be reached to assist in getting every available walnut tree to market. This is urged both as a patriotic duty and as good business, owing to the high prices now being paid for walnut.

Because of its resistance to warping and splitting, walnut is the best wood for these parts of our war-making equipment. Experts of the Forest Service are in the field locating available supplies. Considerable quantities of walnut have been reported by the county agents; and the Boy Scouts, at the request of President Wilson, are making a canvass of walnut owners and have already located over 15,000,000 feet of walnut timber.

Gunstocks are made from planks or "flitches" sawn from second-grade logs and the less desirable portions of better logs. Airplane propellers demand the very best grades of clear walnut lumber. Prices paid at loading points for good walnut logs have sometimes averaged $80 to $90 per thousand feet.

Meteorology for August.—The total precipitation for the month was 2.55 inches. The maximum temperatures for each week were *105° on the 7th*, 97° on the 14th, 91° on the 23d, and 88° on the 26th. The minimum temperatures were 56° on the 1st and on the 11th, *54° on the 18th, on the 20th and on the 28th.*

ACCESSIONS.

MUSEUMS AND HERBARIUM

20 specimens of flowering plants from Long Island, New York. (Given by Mr. W. L. Ferguson.)

4 specimens of figworts from Montana and Idaho. (Given by Dr. J. R. Weir.)

1 specimen of *Hydrangea cinerea* from North Carolina. (By exchange with the Field Museum of Natural History.)

46 specimens of mosses from Washington. (By exchange with Mr. J. M. Grant.)

22 specimens of mosses from Greenland and Maine. (By exchange with Mrs. H. C. Dunham.)

177 specimens of flowering plants for the local herbarium. (By exchange with Rev. L. H. Lighthipe.)

1 specimen of *Pedicularis* from Colombia. (Given by Mrs. Isabel Tracey.)

2 specimens of mosses from the Old World. (By exchange with Mr. H. N. Dixon.)

2 specimens of miscellaneous mosses. (By exchange with Dr. A. Leroy Andrews.)

9 specimens of mosses from California. (By exchange with the University of California.)

14 specimens of mosses from New England. (By exchange with Miss Annie Lorenz.)

12 specimens of mosses from Sanford, Florida. (By exchange with Mr. Severin Rapp.)

55 specimens of flowering plants from the local flora. (By exchange with the Academy of Natural Sciences, Philadelphia.)

6 specimens of sedges from China. (Given by Dr. L. H. Bailey.)

45 specimens of cacti. (By exchange with the United States National Museum.)

14 photographs of specimens of *Annonaceae*. (By exchange with the United States National Museum.)

1 specimen of *Perizoma rhomboidea* from Florida. (By exchange with Mr. Severin Rapp.)

4 specimens of fungi from Colorado. (By exchange with Prof. Ellsworth Bethel.)

9 specimens of fungi from South America. (By exchange with Mr. C. G. Lloyd.)

1 specimen of fungus from Vermont. (By exchange with Dr. L. O. Overholts.)

42 specimens of fungi from Utah. (By exchange with Dr. J. F. Brenckle.)

99 specimens of fungi from Porto Rico. (Collected by Prof. F. L. Stevens.)

2 specimens of *Phyllosticta solitaris* from Arkansas. (By exchange with the United States Department of Agriculture.)

1 specimen of *Geopetalum petaloides* from Ohio. (By exchange with Professor Bruce Fink.)

3 specimens of fungi from Texas. (By exchange with Prof. N. D. Zuber.)

19 specimens of fungi from Porto Rico. (By exchange with Mr. B. Lopez Santiago.)

3 specimens of fungi from the vicinity of New York City. (By exchange with Mr. A. H. Graves.)

2 specimens of fungi from New York. (By exchange with Dr. Charles E. Fairman.)

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Vol. 3, part 1, 1910. Nectriaceae—Fimetariaceae.

Vol. 7, part 1, 1906; part 2, 1907; part 3, 1912. Ustilaginaceae—Aecidiaceae (pars). (Part 1 no longer sold separately.)

Vol. 9 (now complete), parts 1 and 2, 1907; part 3, 1910; part 4, 1915; parts 5, 6, and 7, 1916. Polyporaceae—Agaricaceae (pars). (Parts 1 and 2 no longer sold separately.)

Vol. 10, part 1, 1914; parts 2 and 3, 1917. Agaricaceae (pars).

Vol. 15, parts 1 and 2, 1913. Sphagnaceae—Leucobryaceae.

Vol. 16, part 1, 1909. Ophioglossaceae—Cyatheaceae (pars).

Vol. 17, part 1, 1909; part 2, 1912; part 3, 1915. Typhaceae—Poaceae (pars).

Vol. 21, part 1, 1916; part 2, 1917; part 3, 1918. Chenopodiaceae—Allioniaceae.

Vol. 22, parts 1 and 2, 1905; parts 3 and 4, 1908; part 5, 1913. Podostemonaceae—Rosaceae (pars).

Vol. 25, part 1, 1907; part 2, 1910; part 3, 1911. Geraniaceae—Burseraceae.

Vol. 29, part 1, 1914. Clethraceae—Ericaceae.

Vol. 34, part 1, 1914; part 2, 1915; part 3, 1916. Carduaceae—Anthemideae.

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EDITOR

FRANCIS W. PENNELL

Associate Curator

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JOURNAL

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STUDENTS AND INVESTIGATORS AT THE NEW YORK BOTANICAL GARDEN, 1897–1918

This record gives, as fully as available, and in the order stated, the following data concerning each student and investigator: name and present address; place and date of birth; record of study and research, with dates and degrees; professional record and present position (latter in italic); membership in scientific and honorary organizations; subjects of investigation or special interest.

Abrams, LeRoy, Stanford Univ, Cal. Sheffield, Iowa, Oct. 1, 74. A.B, Stanford Univ, 99; A.M, 02; fellow, Columbia Univ, and N. Y. BOT. GARDEN, 04–05; Ph.D, Columbia Univ, 10; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 05, 10. Act. prof. bot, Idaho Univ, 99–00; asst. systematic bot, Stanford Univ, 00–02; instr, 02–04; asst. curator, Div. Plants, U. S. Nat. Mus, 05; asst. prof. bot, *Stanford Univ*, 06–10; *assoc. prof, 10–;* act. assoc. prof. bot, Univ. Cal, 15. Bot. Soc. Am; West. Soc. Nat; Cal. Acad. Sci; fellow A. A. A. S; Nat. Geogr. Soc. Flora Pacific Coast; dendrology; phytogeography.

Adams, James Fowler, State College, Pa. Boston, Mass, Mar. 5, 88. B.S, Mass. Agric. Coll, 11; M.S, State Coll, Pa, 14; Columbia Univ, 16, 18; Ph.D, 18; N. Y. BOT. GARDEN, 17–18. Lab. asst, Mass. Agric. Coll, 09–11; asst. instr. bot, *State Coll. Pa*, 12–14; *asst. prof. bot, 14–; asst. plant pathologist, Agric. Exp. Sta, Pa, 13–*. A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc; Torrey Bot. Club; Bot. Soc. West. Pa. Pathology.

Altenburg, Edgar, Rice Institute, Houston, Texas. Jersey City, N. J, June 11, 88. Columbia Univ, 07–16; A.B, 11; A.M, 12; Ph.D, 16; N. Y. Bot. Garden, 12–16. Asst. bot, Columbia Univ, 11–16; *instr. biol, Rice Inst, 16–*. Sigma Xi; Bot. Soc. Am. Genetics; cytology.

Ames, Adeline Sarah, Normal, Neb. Henderson, Neb, Oct. 6, 80. B.S, Univ. Neb, 03; A.M, 04; Cornell Univ, 09–11; Ph.D, 13; N. Y. Bot. Garden, 11. Sci. asst, U. S. Dept. Agric, 04–09; asst. pathologist, 12–15. Phi Beta Kappa; Sigma Xi; Am. Phytopath. Soc; Bot. Soc. Am. Mycology; pathology.

Anderson, Mary Perle, East Berkshire, Vt. East Berkshire, Vt, June 9, 64. B.S, Mt. Holyoke Coll, 90; Mass. Inst. Tech, 97–98; Woods Hole, 99; Chicago Univ, 02–04; Columbia Univ. and N. Y. Bot. Garden, 06–08; Kew and Jardin des Plantes, 07; M.A, Columbia Univ, 11. Teacher sci, Kansas City Ladies Coll, Independence, Mo, 90–94; teacher sci, Plymouth H. S, Mass, 94–95; instr. biol, Somerville H. S, Mass, 95–02; instr. nat. study, Vermont State summer schools, 02, 04, 05; instr. biol. and nat. study, summer session, Columbia Univ, 03; instr. bot, Mt. Holyoke Coll, 04–06; teacher biol. and nat. study, Teachers Coll, Columbia Univ, 07–08; teacher nat. study, Horace Mann School, N. Y. City, 08–17; *dir. "The Bluebird," nat.-study camp for children, East Berkshire, Vt, 12–.* First Stokes prize essay, Wild Flower Pres. Soc. Am, 04, 09; Am. Nat. Study Soc. Synopsis and geographical distribution of the ferns of Japan.

Andrews, Albert LeRoy, Cornell Univ, Ithaca, N. Y. Williamstown, Mass, Dec. 27, 78. A.B, Williams Coll, 99; A.M, Harvard Univ, 03; Ph.D, Kiel Univ, 08; research scholar, N. Y. Bot. Garden, 09, 11, 13, 17. Instr. German, Univ. W. Va, 03–04; instr. German, Dartmouth Coll, 04–05; *instr. in German, Cornell Univ, 08–*. Taxonomy of bryophytes.

Arthur, Joseph Charles, Lafayette, Ind. Lowville, N. Y, Jan. 11, 50. B.S, Iowa State Coll, 72; M.S, 77; Johns Hopkins Univ, 78–79; Harvard Univ, 79; Sc.D, Cornell Univ, 86; Bonn, 96; N. Y. Bot. Garden, 03, 04; research scholar, 06, 07, 08, 15, 17; LL.D, Univ. Iowa, 16. Instr. bot, Univs. Minn.

and Wis, 79–82; bot. exp. sta, Geneva, N. Y, 84–87; prof. veg. physiol. and path, Purdue Univ, 87–15; botanist, Purdue Univ. Agric. Exp. Sta, 88–15; *prof. emeritus bot, Purdue Univ, 15–;* Int. Cong. Arts and Sci, St. Louis, 04 (speaker); Int. Bot. Cong, Vienna, 05; Brussels, 10 (del. Smith Inst.). Fellow A. A. A. S. (secy. sec. F, 86; asst. gen. secy, 87; v. pres, 95); Bot. Soc. Am. (pres. 02); hon. fellow, Iowa Acad. Sci; Soc. Prom. Agric. Sci; fellow, Ind. Acad. Sci. (pres. 93); Wash. Acad. Sci; Phila. Acad. Sci; Torrey Bot. Club; Int. Assoc. Bot; Deutsch. Bot. Ges; Am. Phytopath. Soc. Mycology; taxonomy and development of plant rusts.

Arzberger, Emil Godfred, Bureau of Plant Industry, Washington, D. C. Helenville, Wis, Oct. 3, 77. Univ. Wis, 04–09; A.B, 06; fellow, Shaw Bot. Garden, 09–10; Washington Univ, M.A, 10; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 13. Asst. botanist, Ohio Exp. Sta, 10–13; *pathologist, Bur. Pl. Ind, 13–.* Bot. Soc. Am; Torrey Bot. Club; Am. Phytopath. Soc. Mycology; pathology; cytology.

Bailey, Harriet Brown, deceased, Nov. 25, 05. N. Y. BOT. GARDEN, 02–04. Wild Flower Pres. Soc. Am.

Baker, Charles Fuller, Los Baños, Philippine Is. Lansing, Mich, March 22, 72. B.S, Mich. Agric. Coll, 92; A.M, Stanford Univ, 03; N. Y. BOT. GARDEN, 06. Asst. zool, Mich. Agric. Coll, 91–92; asst. zool. and entom, Colo. Agric. Coll, 92–97; zoologist, Ala. Polytech. Inst. and entomologist, Exp. Sta, 97–99; zoologist and assoc. botanist, Ala. biol. surv; in charge, Colorado forestry and zool. expl. exped. in Santa Marta Mts, Colombia, 98–99; teacher biol, Central H. S, St. Louis, 99–01; asst. prof. biol, Pomona Coll, 03–04; chief dept. bot, Estacion Central Agron. de Cuba, 04–07; curator, herbarium and Bot. Garden, Museu Goeldi, Para, Brazil, 07–08; prof. biol, Pomona Coll, 08–12; prof. agron, Univ. of the Philippines, 12–17; asst. dir. Bot. Gardens, Singapore, 17; *prof. and dean, Coll. of Agric, Univ. of the Philippines, 18–.* Fellow A. A. A. S; Assoc. Econom. Entom; Entom. Soc; S. Cal. Acad. Sci; Wash. Entom. Soc; Havana Acad. Entomology; botany.

Banker, Howard James, Eugenics Record Office, Cold Spring Harbor, Long Island, N. Y. Schaghticoke, N. Y, April 19, 66. A.B, Syracuse Univ, 92; M.A, Columbia Univ, 00; Ph.D, 06; N. Y. BOT. GARDEN, 99–00, 02, 03–04, 05, 06, 10. Instr. biol, S. W. Nor. School, California, Pa, 01–04; prof. biol, DePauw Univ, 04 14; *investigator, Eugenics Record Office, 14–;* act. supt. 15–16. Fellow A. A. A. S; Bot. Soc. Am; Torrey Bot. Club. Mycology; taxonomy of Hydnaceae.

Banta, May, Glenbrook, Conn. Brooklyn, N. Y, 65. B.S, Wellesley Coll, 89; Mass. Inst. Tech, 92 93; M.A, Columbia Univ, 00; N. Y. BOT. GARDEN, 99–00. Teacher, Northfield, Mass, 89–92; asst. chem, Wellesley Coll, 93 94; Schenectady, N. Y, H. S, 94–95; Norfolk Private School, 00–01; teacher math, Manual Training H. S, N. Y. City, 02 15.

Barbour, William Clay, 149 Newark Ave, Bloomfield, N. J. Newark Valley, N. Y, Nov. 15, 77. B.S, N. Y. Univ, 13; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 14; N. Y. BOT. GARDEN, 15–16. Asst. prin. & sci. teacher, Sayre, Pa, 98–08; prin. H. S, Succasuma, N. Y, 08–09; asst. teacher biol, H. S. of Commerce, N. Y. City, 09–16; teacher sci, Barringer H. S, Newark, N. J, 16-17; *teacher sci, Central Commercial and Manual Training H. S, Newark, N. J, 17 ;* metallographer for Westinghouse Lamp Co, 17-. Am. Fern Soc; Am. Microscopical Soc; N. Y. Biol. Teach. Soc; Torrey Bot. Club; A. A. A. S. Lichenology.

Barnhart, John Hendley, 2690 Morris Ave, N. Y. City. Brooklyn, N. Y, Oct. 4, 71. A.B, Wesleyan Univ, 92; A.M, 93; M.D, Columbia Univ, 96; N. Y. BOT. GARDEN, 01–03. Int. Bot. Cong, Vienna, 05 (del. N. Y. Bot. Garden); Int. Cong, Brussels, 10 (del. N. Y. Bot. Garden and Torrey Bot. Club.) EDITORIAL ASST, N. Y. BOT. GARDEN, 03–12; LIBRARIAN, 07–12; *bibliographer, 13–.* Fellow A. A. A. S; Am. Soc. Nat; fellow N. Y. Acad. Sci; Bot. Soc. Am; Torrey Bot. Club (editor-in-chief, 03–07, *v. pres, 08–*); N. Y. BOT. GARDEN (life mem.); Biol. Soc. Wash; Vt. Bot. Club; Conn. Bot. Soc. Botanical bibliography and nomenclature; taxonomy of flowering plants, esp. *Lentibulariaceae;* local floras of North America.

Barrett, Alice Irene, deceased. N. Y. BOT. GARDEN, 00–01.

Barrett, Mary Franklin, 19 Elm St, Bloomfield, N. J. Bloomfield, N. J, Aug. 25, 79. B.L, Smith Coll, 01; Barnard Coll, Columbia Univ, 01-02; Woods Hole, 02; Columbia Univ. and N. Y. BOT. GARDEN, 03, 06, 09–10; A.M, Columbia Univ, 05; Cornell Univ, summer, 06. Teacher, H. S, Verona, N. J, 04; teacher sci. and math, Randolph-Pond School, N. Y. City, 05–06; instr. bot, Wellesley Coll, 06–08; *assoc. instr. nat. study, State Nor. School, Upper Montclair, N. J*, 08–14, *16–*. A. A. A. S. American Nat.-Study Soc. Nature study; taxonomy of fungi.

Bateson, Charles Edward Wagstaffe, 78 Franklin St, N. Y. City. New Orleans, La, April 21, 78. E.M, Columbia Univ, 02; A.M, 05; N. Y. BOT. GARDEN, 04–05. A. I. M. E. Paleobotany.

Benedict, Ralph Curtiss, 322 E. 19 St, Brooklyn, N. Y. Syracuse, N. Y, June 14, 83. Ph.B, Syracuse Univ, 06; Ph.D, Columbia Univ, 11; STUDENT AND AID, N. Y. BOT. GARDEN, 06–08; ASST. CURATOR, 09; RESEARCH SCHOLAR, 10, 11, 12; scholar, Columbia Univ, 08–09; fellow, 09–10; *resident investigator, Brooklyn Bot. Garden, 16–*. Instr. bot, N. Y. Univ, summer school, 10, 11; lecturer bot, Fordham Univ. Medical School, 10 11; instr. bot, N. Y. Univ, Coll. Div. and bacter, School of Appl. Sci, 11–12; teacher biol, H. S. of Commerce, N. Y. City, 12–16; *Bushwick H. S, Brooklyn, N. Y, 16–*. Bot. Soc. Am; Torrey Bot. Club; fellow A. A. A. S; Am. Fern Soc; *Editor, Am. Fern Jour*, 10, *12–*. Morphology and phylogeny of ferns; dendrology.

Berman, Florence Julia (Mrs. F. Stevenson), 2860 Creston Ave, N. Y. City. N. Y. City, Jan. 16, 89. A.B, Hunter Coll, 11; Columbia Univ, 11–; N. Y. BOT. GARDEN, 15–17. *Teacher*, Public School 10, Bronx, 11–18; *Public School 6, Bronx, 18–*. Variegation in *Tussilago*.

Billings, Elizabeth, 279 Madison Ave, N. Y. City. Woodstock, Vt, 71. Barnard Coll, Columbia Univ. (special student), 95; N. Y. BOT. GARDEN, 02–03, 04, 05, 06, 08. N. Y. Acad. Sci. (life member); N. Y. BOT. GARDEN (fellow for life). Paleobotany; taxonomy.

Blodgett, Frederick Harvey, A. and M. College of Texas, College Station, Texas. Rockford, Ill, Sept. 12, 72. B.S, Rutgers Coll, 97; M.S, 99; Ph.D, Johns Hopkins Univ, 10; STUDENT AND AID, N. Y. BOT. GARDEN, 00–01. Asst. curator bot, Field Columbian Mus, 01; asst. State Pathologist, Maryland Agric. Coll, 01–06; grad. student asst. bot, Johns Hopkins Univ, 06–10; acting prof. biol. and geol, Roanoke Coll, 10–12; plant pathologist, Texas Exp. Sta, 12–16; *Agric. Extension Service, 16–*. Fellow A. A. A. S; Torrey Bot. Club; Bot. Soc. Am; Ecological Soc. Am; Am. Phytopath. Soc. Pathology; embryology and ontogeny; relation of climate to vegetation; pathology.

Bower, Frederick Orpen, Univ. of Glasgow, Glasgow, Scotland. Ripon, Yorkshire, England, Nov. 4, 55. B.A, Univ. of Cambridge, 77; also M.A. and Sc.D; studied at Würzburg; Strassburg; Kew; Peradeniya; Glasgow; N. Y. BOT. GARDEN (CINCHONA STA.), summer, 09. Asst, Univ. Coll, London, 80–82; lecturer, Royal Coll. of Sci, S. Kensington, 82–85; *Regius Prof. Univ. of Glasgow, 85–*. Fellow Royal Soc. London; Royal Soc. Edinburgh; fellow Linn. Soc. of London; Royal Medal; Linnean medal; Deutsch. Bot. Ges; Bavarian Acad. Wiss; Acad. Sci. Turin. Morphology.

Brackett, Mary Morrell, 780 Riverside Drive, N. Y. City. N. Y. City, July 27, 73. A.B, Hunter Coll, N. Y. City, 93; A.B, Barnard Coll, Columbia Univ, 99; Cold Spring Harbor, 01–02, 03; N. Y. BOT. GARDEN (CINCHONA STA.), 04; A.M, Columbia Univ, 07. Secy Wadleigh H. S, N. Y. City, 00–09; teacher biol, Morris H. S, N. Y. City, 09–12; *Secy Morris H. S, 12–*. A. A. A. S; Barnard Bot. Club; Asst. editor, Plant World, 06–07. Morphology; physiology.

Braislin, Anna Priscilla (Mrs. Thomas H. Montgomery, Jr.), 2139 Cypress St, Philadelphia, Pa. A.B, Vassar Coll, 97; Univ. Pa, Philadelphia; N. Y. BOT. GARDEN, 99–00.

Brandenburg, Ellen Klapp (Mrs. H. Knight), 902 Bathurst St, Toronto, Canada. Philadelphia, Pa, 82. B.S, George Washington Univ, 04; Harvard Univ, summer school, 03; Cold Spring Harbor, 05; Cornell Univ, summer school, 06; N. Y.

Bot. Garden, 07; A.M, Columbia Univ, 08; Chicago Univ, 10. Instr. biol. and English, Washington High Schools, 04 07; instr. biol, 08–16. Mycology.

Braun, Harry, Bureau of Plant Industry, Washington, D. C. Palestine, Asia, Jan. 26, 95. B.S, Cornell Univ, 15; Columbia Univ, 16–17; President Univ. Scholarship, Feb.–June, 17; N. Y. Bot. Garden, 17. Inspector of white pine blister rust, Conservation Com. N. Y. State, 15; asst. plant path, Cornell Univ, 15–16; sci. asst, Cotton & Truck disease office. Bur. Pl. Ind, 16; *sci. asst. pl. path, Bur. Pl. Ind, 17* . Torrey Bot. Club. Pathology; bacteriology.

Bray, William L, Syracuse Univ, Syracuse, N. Y. Burnside, Ill, Sept. 19, 65. Cornell Univ, 89–91; A.B, Indiana State Univ, 93; Lake Forest, 93–94; M.A, 94, Univ. of Berlin, 96–97; Ph.D, Univ. Chicago, 98; N. Y. Bot. Garden, 06. Instr. bot, Lake Forest, 94–95; adj. prof. biol, 96; instr. bot, Univ. Texas, 97–98; adj. prof, 98–01; assoc. prof, 02–05; prof, 05–07; *prof. bot, Syracuse Univ, 07–; dean graduate school, 17–.* Fellow A. A. A. S; Bot. Soc. Am; Int. Assoc. Bot; Torrey Bot. Club; Phi Beta Kappa; Sigma Xi. Ecology.

Bristol, Warren Edwin, present address not known. Waltham, Vt, July 17, 86. B.A, Middlebury Coll, 07; N. Y. Bot. Garden, 11, 12; M.A, Columbia Univ, 12. Instr. biol, Middlebury Coll, 07–10; instr, Syrian Protestant Coll, Beirut, Syria, 10–11; educ. dir, East Side Y. M. C. A, N. Y. City, 11, 12. Starches of drug plants; biological chemistry; taxonomy of phanerogams.

Britton, Elizabeth Gertrude (Knight) (Mrs. N. L. Britton), N. Y. Bot. Garden, Bronx, N. Y. City. N. Y. City, Jan. 9, 58. Private schools, Matanzas, Cuba, to 69; private school, 6 East 42 St, 69–73; grad, Hunter Coll, N. Y. City, 75; N. Y. Bot. Garden, 99–. Critic teacher, Training Dept, Hunter Coll, 75–82; asst. nat. sci, 82 85; *honorary curator of mosses, N. Y. Bot. Garden, 12–.* Torrey Bot. Club; Sullivant Moss Soc; Conn. Bot. Soc; Bot. Soc. Am; Am. Fern Soc. Morphology; taxonomy of bryophytes.

Broadhurst, Jean, Teachers Coll, Columbia Univ, N. Y. City. Stockton, N. J, Dec. 29, 73. N. J. State Nor. School, Trenton, N. J, 92; B. S,Teachers Coll, Columbia Univ, 03; A.M, 08; N. Y. BOT. GARDEN, 01–02, 11, 12; Cornell Univ, 11–12; Ph.D, 14. Asst. bot, Barnard Coll, Columbia Univ, 02–03; instr. biol. and nat. study, N. J. State Nor. School, 03–06; instr. biol, *Teachers Coll, Columbia Univ*, 06–14; *asst. prof. biol, 14-*. Fellow A. A. A. S; Torrey Bot. Club; Wild Flower Pres. Soc. Am. (2d Stokes prize essay, 04); Nat. Study Soc; editor, Torreya, 08–11; *assoc. editor Bull. Torrey Bot. Club, 11–; council Soc. Am. Bacteriologists, 16–*. Morphology; Bacteriology (*Streptococci*).

Broomall, Laura Baker, 32 Nostrand Ave, Far Rockaway, N. Y. B.S, Univ. Mich, 98; N. Y. BOT. GARDEN, 03. *Teacher biol, H. S, Far Rockaway, N. Y.* Embryology of spermatophytes.

Bruckman, Louisa, 209 West 97 St, N. Y. City. N. Y. City, March 16, 72. Hunter Coll, N. Y. City, 87–91; Pd.B, 95; Pd.M, N. Y. Univ, 95; B.S, 07; Cornell Univ, summer school, 99; Cold Spring Harbor, 00, 01, 03; N. Y. BOT. GARDEN, 00–01. Teacher, elementary schools, N. Y. City, 92–02; instr. biol, Girls' H. S, Brooklyn, N. Y, 02 12; *head biol. dept, Bay Ridge H. S, Brooklyn, N. Y, 12–*. N. Y. Assoc. Biol. Teachers; Nat. Geogr. Soc; Patriotic Service League; Am. Red Cross Soc; Nat. Study League.

Brues, Charles Thomas, Bussey Inst, Forest Hills, Boston, Mass. Wheeling, W. Va, June 20, 79. B.S, Univ. of Texas, 01; M.S, 02; N. Y. BOT. GARDEN, 02 03; Univ. fellow zool, Columbia Univ, 02–03; scholar in zool, 03–04. Special field agent, U. S. Dept. Agric, 04 05; member of staff, Marine Biol. Lab, Woods Hole, 03; curator invert. zool, Milwaukee Pub. Mus, 05–09; instr. econom. entom, Harvard Univ, 09–12; *asst. prof. econom. entom, Harvard Univ, 12–*. Wis. Nat. His. Soc. (gen. secy. and editor, Quarterly Bull, 06–09); Am. Acad. Arts & Sci; fellow A. A. A. S; Assoc. Econom. Entom; Entom. Soc. Am; Wis. Acad. Sci; Cambridge Entom. Club; *editor of Psyche, 10–;* Boston Soc. Nat. Hist. Taxonomy and ecology of grasses.

Budington, Robert Allyn, Oberlin Coll, Oberlin, Ohio. Leyden, Mass, Oct. 22, 72. A.B, Williams Coll, 96; A.M, 99; Columbia Univ. and N. Y. Bot. Garden, 99-02. Instr. math. and sci, Dow Acad, Franconia; asst. biol, Williams Coll, 98–99; asst. demonstr. physiol, Columbia Univ, 00–02; instr zool. and physiol, Mt. Hermon School, 02–05; instr. biol, Wesleyan Univ, 05–08; assoc. prof. zool, *Oberlin Coll*, 08–13; *prof, 13–*. Fellow A. A. A. S; Am. Soc. Zool. (Eastern branch); Am. Soc. Nat; Ohio Acad. Sci. Ecology; zoology.

Burlingham, Gertrude Simmons, Eastern District H. S, Brooklyn, N. Y. Mexico, N. Y, April 21, 72. A.B, Syracuse Univ, 96; Woods Hole, 99; N. Y. Bot. Garden and Columbia Univ, 05–08; Ph.D, 08. Preceptress, Ovid Union School, N. Y, 96–98; teacher biol. sci, Binghamton H. S, N. Y, 98–05; instr. biol, N. J. State Nor. School, Trenton, Mar.–June, 08; *teacher biol, Eastern District H. S, Brooklyn, N. Y, 08–*. Torrey Bot. Club; Brooklyn Inst. Arts and Sci; Bot. Soc. Am; Columbia Univ. Biochem. Assoc; N. Y. Assoc. Biol. Teachers. Biology; mycology; taxonomy of *Agaricaceae;* plant physiology.

Burr, Freeman Foster, State Geologist, Augusta, Me. Medford, Mass, March 7, 77. B.S, Harvard Univ, 00; A.M, Columbia Univ, 13; N. Y. Bot. Garden, 12–13. Asst. botany, Harvard Univ, 99 00; teacher sci, Chicago Latin School, 00–01; H. S, Natick, Mass, 03–04; asst. bot. and geol, Harvard Univ, 02–03; teacher sci, State Normal School, New Haven, Conn,04–12; lecturer in geology, Barnard College, 12–13. Paleobotany.

Butler, Bertram Theodore, Leonia, N. J. Nashua, Iowa, March 22, 72. Ph.B, Hamline Univ, 01; N. Y. Bot. Garden, 07; A.M, Columbia Univ, 08. Special research work for the Continental Rubber Co, N. Y. City, 10–12; installed bot. exhibit in Nat. His. Mus, Pittsfield, Mass, 12–14; teacher public schools, S. Dak, 90–98; instr. sci, Montana Wesleyan Univ, 03–05; city supt. schools, Glendive, Mont, 05–07; *instr. bot, Coll. of the City of N. Y, 09–*. Torrey Bot. Club. Economic botany; india-rubber and rubber-producing plants.

Byrnes, Esther Fussell, Girls' H. S, Brooklyn, N. Y. City. Philadelphia, Pa, Nov. 3, 66. A.B, Bryn Mawr Coll, 91; A.M,

94; fellow, 94-95; Ph.D, 98; N. Y. Bot. Garden, 02–03. Demonstr. biol, Vassar Coll, 91–93; Bryn Mawr Coll, 95–97; *teacher biol, Girls H. S, Brooklyn, 98–*. Am. Soc. Nat; Mar. Biol. Assoc; fellow, N. Y. Acad. Sci; A. A. A. S; Am. Soc. Zool; Eugenics Research Assoc; Am. Genetic Assoc. Cytology; zoology; experimental morphology; sexual reproduction among cryptogams.

Cameron, Walter Scott, 239 E. 136 St, N. Y. City. N. Y. City, Jan. 30, 76. A.B, Coll. City N. Y, 95; Columbia Univ, 96–99; 06–14; A.M; N. Y. Bot. Garden, 13–14. Teacher biol, Eastern District H. S, Brooklyn, N. Y, 06; Manual Training H. S, N. Y. City, 08–09; Commercial H. S, N. Y. City, 09-12; *Wadleigh H. S, N. Y. City, 12–*. A. A. A. S; Torrey Bot. Club; Am. Chem. Soc; Am. Electrochem. Soc. Mosaic disease of tobacco.

Cannon, Gertrude Louise, 1786 Clay Avenue, N. Y. City. N. Y. City, July 9, 86. A.B, Barnard Coll, Columbia Univ, 07; Teachers Coll, Columbia Univ, 07–08; A.M, Columbia Univ, 09; N. Y. Bot. Garden, 10. Research worker, Long Island State Hospital, 10; teacher biol, Washington Irving H. S, 14; *reference dept, N. Y. Pub. Library, 15–*. Torrey Bot. Club. Morphology and taxonomy of bryophytes and fungi.

Cannon, William Austin, Tucson, Arizona. Washington, Mich, Sept. 23, 70. A.B, Stanford Univ, 99; A.M, 00; fellow, Columbia Univ, 00 02; Ph.D, 02. Asst. bot, Stanford Univ, 99 00; lab. asst, N. Y. Bot. Garden, 02 03; Carnegie fellow, 06; resident investigator, Desert Bot. Lab, Carnegie Inst, Tucson, Ariz, 03–05; *member of staff, dept. of Bot. Records, Carnegie Inst. of Wash, 05–*. Fellow A. A. A. S; Bot. Soc. Am; Am. Soc. Nat; West. Soc. Nat; Ecol. Soc. Am. Biology of desert plants with especial reference to root habits and root responses to environmental condition.

Cardiff, Ira Dietrich, Yakima, Wash. Goshen T'p, Stark Co, Ill, June 20, 73. B.S, Knox Coll, Ill, 97; Chicago Univ, 99–04; Ph.D, Columbia Univ, 06; N. Y. Bot. Garden, 04–06. Asst. bot, Columbia Univ, 04 06; asst. prof. bot, Univ. of Utah, 06-07; prof, 07–08; prof. bot, Washburn Coll, 08–12;

prof. plant physiology and bacteriology, Wash. State College, 12–13; director Wash. Exp. Sta. and head dept. bot. Wash. State College, 13–17; *manager, Ira D. Cardiff & Co. (food processing), 17–.* Fellow A. A. A. S; Kans. Acad; Utah Acad. Morphology, cytology.

Carse, Elizabeth, 129 E. 30 St, N. Y. City. Ph.B, Cornell Univ, 95; Harvard Univ, summer, 98; Univ. Chicago, summer, 99; N. Y. Bot. Garden, 00–01; M.A, Columbia Univ, 10; Columbia Univ, 12–; Research eng. lit, Oxford & Cambridge, Eng, 13–14. Asst. physics and biol, Teachers Coll, Columbia Univ, 95–96; instr. biol. and physical geog, 97–00; supervisor nat. study, Horace Mann School & instr. biol, Teachers Coll, 00–02; prin. Charlton School, N. Y. City, 03–12; *prin. Northrop Collegiate School, Minneapolis, Minn, 15–.* Nat. Educ. Assoc; Minn. Educ. Assoc.

Chedsey, Mary Coe (Mrs. H. Mark Thomas), 611 W. 110 St, N. Y. City. N. Y. City, 79. A.B, Hunter Coll, N. Y. City, 98; B.S, Teachers Coll, Columbia Univ, 04; Barnard Coll, Columbia Univ; N. Y. Bot. Garden, 04–05; Woods Hole, summer, 03; Cold Spring Harbor, 05. Teacher, N. Y. City elem. schools, 98–02; teacher sci, Charlton School, N. Y. City, 04–05; sub. teacher, N. Y. Training School for Teachers, 06. Torrey Bot. Club.

Clark, Anna May, Training School for Teachers, 212 W. 120 St, N. Y. City. Brookfield, Vt, April 21, 74. State Nor. School, New Britain, Conn, 96; Ph.B, Vt. Univ, 98; master's diploma, Teachers Coll, Columbia Univ, 04; M.A, 04; N. Y. Bot. Garden, 03–04. Teacher sci, State Nor. School, Framingham, Mass, 99–03; teacher sci. and nat. study, *N. Y. City Training School for Teachers*, 04–07; *first asst. and head dept, 07–.* A. A. A. S; Am. Nat. Study Soc; N. Y. Biology Teachers' Assoc; Vt. Educ. Assoc; Nat. Educ. Assoc; Audubon Soc; Phi Beta Kappa. Biology; nature study.

Clark, Ernest Dunbar, Pacific Coast Fish Investigations, 417 Market Street, San Francisco, Cal. Boston, Mass, May 4, 86. John Harvard scholar, 06–07; research asst. dept. physiol. chem, Harvard Univ, medical school, 07–08; A.B. (in chem-

istry), 08; fellow, physiol. chem, Columbia Univ, 09–10; A.M, 09; Ph.D, 10; Columbia Univ, and N. Y. Bot. Garden, 08–11, 12, 13; RESEARCH SCHOLAR, 12. Asst. chem, Harvard Univ, 07 08; instr. biol. chem, Columbia Univ, 10–11; instr. chem, Cornell Medical School, 12 13; *chemist, Bureau Chem, U. S. Dept. Agric. 13–; in charge Pacific Coast food investigation, San Francisco, 17–.* Fellow A. A. A. S; Am. Chem. Soc; N. Y. Acad. Sci; Assoc. Harvard Chemists; Torrey Bot. Club; Columbia Biochem. Assoc. Problems in plant chemistry.

Clements, Edith (Schwartz) (Mrs. Frederick E. Clements), Tucson, Arizona. A.B, Univ. Neb, 98; Ph.D, 04; N. Y. Bot. Garden, 02. Instr, Univ. Minn, 09 -14.

Clements, Frederic Edward, Tucson, Arizona. Lincoln, Neb, Sept. 16, 74. B.S, Univ. Neb, 94; A.M, 96; Ph.D, 98; N. Y. Bot. Garden, 02. Asst. bot, Univ. Neb, 94–97; instr, 97–01; adj. prof, 01–03; asst. prof, 03–05; assoc. prof. plant physiol, 05–06; prof, 06–07; prof. bot, Univ. Minn, 07–17; *assoc. ecology, Carnegie Inst, Wash, 17–.* Fellow A. A. A. S; Bot. Soc. Am; Sigma Xi; Phi Beta Kappa. Phytoecology; mycology.

Coker, Dorothy, 136 W. 65 St, N. Y. City. Hartsville, S. C, May 6, 94. A.B, Wellesley Coll, 17; N. Y. Bot. Garden and Columbia Univ, 17-18; M.A, 18. Mosses.

Coker, William Chambers, Univ. of North Carolina, Chapel Hill, N. C. Hartsville, S. C, Oct. 24, 72. B.S, Univ. S. C, 94; Ph.D, Johns Hopkins Univ, 01; Bonn, 01–02; N. Y. Bot. Garden (Cinchona Sta.), summer, 00, 05, 07, 09, 10, 11. Asst. bot, Cold Spring Harbor, 00; assoc. prof. bot, *Univ. N. C,* 02 - 08; *prof, 08–;* chief of bot. staff, Bahama exped. of Baltimore Geogr. Soc, 03. *dir. of arboretum, Univ. N. C.* Fellow A. A. A. S; Am. Soc. Nat; Bot. Soc. Am; N. C. Acad. Sci. (v. pres, 07–10, *pres, 10–*); *editor Jour. of Elisha Mitchell Sci. Soc.* Cytology; embryology.

Cook, Melville Thurston, Agric. Exp. Sta. New Brunswick, N. J. Coffeen, Ill, Sept. 20, 69. DePauw Univ, 88–89, 91–93; A.B, Stanford Univ, 94; A.M, DePauw Univ, 01; fellow, Ohio State Univ, 01 02; Ph.D, 04; Woods Hole, 96,99, 00; Univ. Chicago, summer, 97, 98; summer lab, Sandusky, Ohio, 02

–03; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 07. Prin, H. S, Vandalia, Ill, 94–95; instr. biol, DePauw Univ, 95–97; prof, 97–04; lecturer human embryol, Central Coll. Physicians and Surgeons, Indianapolis, Ind, 02–03; comp. anat, Medical Coll, Md, 03–04; chief dept. plant path. and econom. entom, Estacion Central Agron. de Cuba, Santiago de las Vegas, Cuba, 04–07; prof. bot, Delaware Coll, and plant path, exp. sta, 07–11; *prof. plant path, Rutgers College, and Agric. Exp. Sta, 11–.* Fellow A. A. A. S; (*secy. sec. G, 18–*); Assoc. Econom. Entom; fellow Ind. Acad. Sci; Bot. Soc. Am; Am. Phytopath. Soc. (pres, 17); Entom. Soc. Am; New Brunswick Sci. Soc. (pres, 15–16); Sigma Xi; Phi Beta Kappa. Pathology; resistance or immunity to disease; cecidology.

Corry, Robert Thomas, 3703 Willett Ave, N. Y. City. N. Y. City, Jan. 26, 89. M.D, Coll. of Physicians and Surgeons, 13; A.B, Columbia Univ, 16; N. Y. BOT. GARDEN, 11. Surgeon to Am. Ambulance, Neuilly, France, 14–15; *instr. anat, Fordham Univ, 16–; asst. attending surgeon, N. Y. Hospital, House of Relief, 17–.* Physiological chemistry of plants; toxins of bacteria and fungi.

Crane, Amelia Blair, Scarsdale, N. Y. N. Y. City, Jan. 18, 70. Certificate, Barnard Coll, Columbia Univ; N. Y. BOT. GARDEN, 04–05. Mycology.

Cummings, Clara Eaton, deceased Dec. 28, 06. Plymouth, N. H, July 13, 55. Wellesley Coll, 76–79; Zurich, 86–87; N. Y. BOT. GARDEN (CINCHONA STA.), 05. Instr. bot, Wellesley Coll, 79–87; assoc. prof, 87–03; prof, 03–06. Chief editor, "Decades of N. A. Lichens" and "Lichenes Boreali"; assoc. editor Plant World, 05–06; fellow A. A. A. S; Soc. Plant Morphol. and Physiol. (v. pres, 04); Mycol. Soc; Torrey Bot. Club; Bost. Soc. Nat. Hist; Bost. Mycol. Club; Wild Flower Pres. Soc. Am. Lichenology.

Darling, Chester Arthur, Alleghany Coll, Meadville, Pa. Leon, N. Y, Oct. 4, 80. A.B, Albion Coll, 04; A.M, 06; Ph.D, Columbia Univ, 09; Columbia Univ. and N. Y. BOT. GARDEN, 06–13. Prof. biol, Defiance Coll, Defiance, O, 04–06; asst. bot, Columbia Univ, 06–08; tutor bot, 08–10; instr. bot, 10–

13; *prof. biol, Alleghany Coll, 13–*. A. A. A. S; Bot. Soc. Am; Am. Pub. Health Assoc; Soc. Am. Bacteriologists; Am. Genetic Assoc. Cytology; bacteriology.

Darrow, Isabelle Caroline (Mrs. R. R. Stewart), Gordon Coll, Rawalpindi, India. Hebron, N. Y, June 29, 88. A.B, Middlebury Coll, 11; Anatolia Coll, Marsovan, Turkey, 12–13; N. Y. Bot. Garden and Columbia Univ, 15–16; A.M, 16. Teacher South Hero Rural School, 08; teacher sci, Anatolia Girls' School, Marsovan, Turkey, 11–15; teacher physiol, Anatolia Hosp, 13–14. Genetics.

Delafield, Mrs. John Ross (See White, Violette S.).

Derickson, Samuel Hoffman, Lebanon Valley Coll, Annville, Pa. B.S, Lebanon Valley Coll, 02; M.S, 03; Johns Hopkins Univ, 03–11; Bahama exped, 03; N. Y. Bot. Garden (Cinchona Sta.), 10; Cold Spring Harbor, 10. Act. prof. biol, *Lebanon Valley Coll*, 04–06; *prof. biol, 07–*. Bot. Soc. Am; A. A. A. S. Morphology and taxonomy of Hepaticae; taxonomy of various groups of plants.

Dodge, Bernard Ogilvie, Columbia Univ, N. Y. City. Mauston, Wis, April 18, 72. Grad, Milwaukee Nor. School, 01; Univ. Wis, various times, 95 08; Ph.B, 08; Columbia Univ. and N. Y. Bot. Garden, 08 12; Ph.D, 12; research scholar, N. Y. Bot. Garden, 12. Prin, H. S, Greenwood, Wis, 96–00; Algoma H. S, 01–07; research asst, *Columbia Univ*, 11–13; *instr. 13–*. A. A. A. S; Bot. Soc. Am; Torrey Bot. Club (*secy. and treas, 11–*); Am. Phytopath. Soc. Mycology; pathology.

Dow, Bertha McLane, present address not known. New York City, June 3, 69. Barnard Coll. (spec. student), 95, 01–02; N. Y. Bot. Garden, 00–01; Woods Hole, summer, 06. Instr. sci, Park Ave. School, N. Y. City, 01 05; instr. sci, The Alcuin Prep. School, N. Y. City, 05 ?. Biology.

Dufour, Alice, present address not known. Gallipolis, Ohio, Aug. 22, 63. Ohio State Univ, 97–99; A.B, Defiance Coll, O, 99; fellow and asst. bot, Ohio State Univ, 99–00; N. Y. Bot. Garden, 00–01, 02–03; A.M, Columbia Univ, 03; directora, Escuela practica de señoritas, Guatemala City, Cent. Am, 05–07; principal Stockbridge Hall, Yarmouth, Me, 07. Sociology; botany.

Dumm, Mrs. Walter J. (See Lord, Mary Elizabeth).

Dunn, Louise Brisbane, deceased Dec. 18, 02. A.B, Barnard Coll, Columbia Univ, 97; A.M, 99; N. Y. BOT. GARDEN, 99–00.

Durand, Elias Judah, Univ. of Minnesota, Minneapolis, Minn. Canandaigua, N. Y, March 20, 70. A.B, Cornell Univ, 93; Sc.D, 95; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 05. Asst. bot, Cornell Univ. and asst. crypt. bot, Agric. Exp. Sta, 95–96; instr. bot, 96–10; asst. curator herb, 98–00; asst. prof. bot, Univ. of Missouri, 10–12; assoc. prof, 12–18; *prof. bot, Univ. Minn*, 18–. Fellow A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc; Sigma Xi. Mycology; discomycetes; embryology.

Eaton, Elon Howard, Hobart Coll, Geneva, N. Y. Springville, N. Y, Oct. 8, 66. Griffith Inst, 85; A.B, Univ. Rochester, 90; A.M, 93; M.S, 10; Columbia Univ. and N. Y. BOT. GARDEN, 99–00; Woods Hole, 08. Asst. principal, Canandaigua H. S, 89, and teacher sci, 90–95; master of sci, The Bradstreet School, Rochester, N. Y, 95–06; *prof. biol, Hobart Coll, Geneva, N. Y, 07–*. Fellow A. A. A. S; Am. Ornith. Union; fellow, Rochester Acad. Sci; Forestry Assoc. Ornithology and botany, ecology and forestry.

Eggleston, Willard Webster, 612 Randolph St, NW, Washington, D. C. Pittsfield, Vt, March 28, 63. B.S, Dartmouth Coll, 91; student Gray Herbarium, 07; Biltmore Herbarium, 07–08; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 08. Asst. city engineer, Rutland, Vt, 93–97; civil engineering, 97–04; AID, N. Y. BOT. GARDEN, 04–07; lecturer of surveying, Biltmore Forest School, 07–08; acting asst. curator, U. S. Nat. Mus, 08–09; *asst. bot. (Poison Plants), Bur. Pl. Ind, 10–*. Fellow A. A. A. S; charter and life member, Vt. Bot. Club (v. pres, 12–14); N. Eng. Bot. Club; Torrey Bot. Club; Wash. Bot. Club; Biol. Soc. Wash; Am. Fern Soc; Nat. Geogr. Soc; Bot. Soc. Am; Thayer Soc. Civil Engineers. Taxonomy of poisonous plants, *Lupinus, Delphinium,* etc; *Crataegus; Pomaceae.*

Emerson, Julia Titus, 131 E. 66 St, N. Y. City. N. Y. City, April 6, 77. Coll. Pharm, Columbia Univ, 98; Teachers Coll,

Columbia Univ, 98–99; Woods Hole, 99, 00, 01, 03, 04; Briarcliff Manor Agric. School, 01; N. Y. Bot. Garden, 02–04, 04–09; 11–13, Barnard Coll, Columbia Univ, 14–15; Teachers Coll, Columbia Univ, 15–16. Spec. asst. plant path, Purdue Univ, 02; lab. asst, N. Y. Bot. Garden, 03–04; private tutor bot, 06. Torrey Bot. Club; Wild Flower Pres. Soc. Am; National Conserv. Assoc; Bot. Soc. Am; Taxonomy of mosses.

Evans, Helena (Mrs. Johan D. Struys), Douglaston, N. Y. Ph.B, Syracuse Univ, 01; N. Y. Bot. Garden, 06–07. Teacher, H. S, New Berlin, N. Y; Charleston, Ill, 02–03.

Fairman, Charles Edward, Lyndonville, N. Y. Yates, N. Y, Dec. 28, 56. A.B, Univ. Rochester, 74; A.M, 77; M.D, St. Louis Medical School (Washington Univ.), 77; N. Y. Bot. Garden, 10–11. Corr. Mem. Rochester Acad. Sci. Mycology; taxonomy of Ascomycetes.

Faulwetter, Roy Christopher, Clemson Coll, Clemson, S. C. Covington, Ky, May 28, 90. A.B, Miami Univ, 12; fellow plant path, Cornell Univ, 12 14; Columbia Univ, 14–16; research scholar, N. Y. Bot. Garden, 15. Student asst. bot. and zool, Miami Univ, 11 12; asst. bot, Columbia Univ, 14–16; *assoc. botanist and plant pathologist, Clemson Coll, S. C, 15–.* Am. Phytopath. Soc; Torrey Bot. Club; Phi Beta Kappa; Sigma Xi. Cytology; pathology.

Fawcett, Edna Hague, Pine Mountain, Harlan Co, Ky. Washington, D. C, Feb. 26, 79. B.L, Smith Coll, 01; Barnard Coll, Columbia Univ, 02–03; N. Y. Bot. Garden, 04–05. Teacher, pub. schools, Springfield, Mass, 01–02; teacher, prim. work and nat. study, Miss Keller's Day School, N. Y. City, 02–05; sci. asst, Bur. Pl. Ind. (Lab. soil bact. and water purif. investig.), 06–12; *starting poultry and dairy work, Pine Mountain Settlement School, 17–.* Soil bacteriology.

Field, Ethel Content (Mrs. Tillotson), present address not known. Scholar bot, Univ. Neb, 08–09; A.B, 08; M.A, 09; N. Y. Bot. Garden, 10. Asst. bot, Univ. Neb, 08–09; teacher bot. in School of Agric. to County Teachers, summer, 09. Sigma Xi. Phytopathology; physiology and taxonomy of fungi.

Fink, Bruce, Miami Univ, Oxford, Ohio. Blackberry Twp, Kane Co, Ill, Dec. 22, 61. B.S, Univ. Ill, 87; M.S, 94; M.A, Harvard Univ, 96; Ph.D, Univ. Minn, 99; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 11, 14. Prof. biol, Upper Iowa Univ, 92–03; prof. bot, Iowa Coll, 03–06; *prof. bot, Miami Univ, 06–.* Fellow A. A. A. S; Am. Soc. Nat; Bot. Soc. Am; Iowa Acad. Sci. (pres, 04); Ohio Acad. Sci. (pres, 12); Park and Forestry Assoc. of Iowa; Ohio Forestry Assoc; Sigma Xi. Morphology and taxonomy of Ascomycetes; the *Graphidaceae* of North America.

Fitzpatrick, Harry Morton, N. Y. State Coll. Agric, Ithaca, N. Y. Greenwood, Ind, June 27, 86. Wabash Coll, 05–08; Cornell Univ, 08–13; A.B, 09; Ph.D, 13; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 17; Asst. bot, *Cornell Univ*, 08–12; instr. plant path, 12–14; *asst. prof. plant path, 14–.* A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc. Plant pathology.

Fraser, Allen Cameron, Cornell Univ, Ithaca, N. Y. Brockport, N. Y. June 4, 90. B.S, Cornell Univ, 13; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 14. Asst. plant breeding, Cornell Univ, 12–13; ASST. PLANT BREEDING, N. Y. BOT. GARDEN, summer, 13; asst. bot. and hort, Columbia Univ, 13–14; *instr. genetics, Cornell Univ, 14–.* Genetics.

Fromme, Fred Denton, Agric. Exp. Sta, Blacksburg, Va. St. Paris, Ohio, April 2, 86. Ohio State Univ, 04–05; Winona Tech. Inst, Indianapolis, 07; S. Dakota State Coll, 10–11; B.S, 11; Columbia Univ, 11–13; Ph.D, 13; N. Y. BOT. GARDEN, 11–13; RESEARCH SCHOLAR, 12. Asst. bot, S. Dakota Coll, 10–11; asst. bot, Columbia Univ, 11 13; asst. botanist, Agr. Exp. Sta, Lafayette, Ind, 13–15; *prof. plant path. and bacteriol, Va. Polytech. Inst, and plant pathologist and bacteriologist, Agric. Exp. Sta, Blacksburg, Va, 15–.* Fellow A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc. Taxonomy of the rusts; plant pathology.

Gager, Charles Stuart, Brooklyn Botanic Garden, Brooklyn, N. Y. Norwich, N. Y, Dec. 23, 72. A. B,Syracuse Univ, 95; Pd.B. and Pd.M, N. Y. State Nor. Coll, 97; Harvard Univ, 97; Ph.D, Cornell Univ, 02. Lab. asst. biol, Syracuse Univ, 94-

95; v. principal, Ives Sem, N. Y, 95–96; prof. biol. sci. and physiog, N. Y. State Nor. Coll, Albany, 97 05; asst. bot, Cornell Univ, summer, 01–02; instr, 05; collaborator, Jour. Applied Micros, 01–02; LAB. ASST, N. Y. BOT. GARDEN, 04–05; acting prof. bot, Rutgers Coll, 05; prof. bot, N. Y. Univ, summer, 05, 06; teacher biol, Morris H. S, N. Y. City, 05; DIRECTOR OF THE LABORATORIES, N. Y. BOT. GARDEN, 06–08; prof. bot, State Univ, Missouri, 08–10; *director, Brooklyn Botanic Garden, 10* . Assoc. editor, Plant World, 05; fellow A. A. A. S; fellow, Am. Geol. Soc; 05–06; N. Y. State Teachers Assoc, 01–04; Albany Entom. Soc. 98–04 (v. pres, 98–99); Torrey Bot. Club (secy, 05 08); Soc. Exp. Biol. & Med; Am. Soc. Biol. Chemists; Bot. Soc. Am; St. Louis Acad. Sci, 08–10; Phi Beta Kappa; Sigma Xi. Plant physiology; cytology.

Gaines, Elizabeth Venable, Saxe, Va. Mossingford, Va, April 25, 69. Vassar Coll, 89; Mass. Inst. Tech, 92 94; Chicago Univ, 98; A.B, Adelphi Coll, 99; M.A, Columbia Univ, 03; N. Y. BOT. GARDEN, 02–03. Prof. biol, Adelphi Coll, 97–16. A. A. A. S; Eugenics Research Assoc. Scientific agriculture.

Gardner, John Robert, 24 E. 99 St, N. Y. City. Fayette, Iowa, Feb. 19, 70. B.S, Upper Iowa Univ, 90; C.E, State Univ. of Iowa, 94; M.S, Upper Iowa Univ, 98; N. Y. BOT. GARDEN, 00, 01, 02. *Head. dept. math, Allen Stevenson School, N. Y. City.* A. A. A. S; Math. Soc. Botany; mathematics.

Gilman, Charles Winthrop, Palisades, N. Y. N. Y. BOT. GARDEN, 00–01. Mosses.

Gilman, Joseph Charles, Ripon Coll, Ripon, Wis. Hasting, Neb, Mar. 23, 90. B.S.A, Univ. Wis, 12; M.S, 14; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 13; Rufus J. Lackland Fellow, Shaw School of Bot, Washington Univ, 14–15; Ph.D, Washington Univ, 15. Asst. plant path, Univ. Wis, 12–14; instr. plant path, summer session, 14; *prof. biol, Ripon Coll, 15–.* Am. Phytopath. Soc; Bot. Soc. Am; Sigma Xi. Pathology; plant physiology; mycology.

Gleason, Henry Allan, Univ. of Michigan, Ann Arbor, Mich. Dalton City, Ill, Jan. 2, 82. B.S, Univ. Ill, 01; M.A, 04; fellow, Ohio State Univ, 04–05; Ph.D, Columbia Univ, 06; N. Y. BOT.

GARDEN, 05–06; RESEARCH SCHOLAR, 13, 18. Asst. bot, Univ. Ill, 01–03; instr, 03–04; 06–09; assoc, 09–10; special asst, Missouri Bot. Garden, summer, 04; *Univ. Mich*, Mus. exped. to Isle Royale, summer, 05; asst. prof. bot, 10–16; *assoc. prof, 16–* dir. Biol. Sta, 13–15; *dir. Bot. Garden and Arboretum, 15–.* Fellow A. A. A. S; Bot. Soc. Am; Torrey Bot. Club; Mich. Acad. Sci; Assoc. Am. Geographers; Sigma Xi. Ecology and phyto-geography with special reference to the prairie province and to post-glacial migration.

Gordon, Clarence Everett, Mass. Agric. Coll, Amherst, Mass. Clinton, Mass, Feb. 15, 76. B.S, Mass. Agric. Coll, 01; B.S, Boston Univ, 03; M.A, Columbia Univ, 05; Ph.D, 11; N. Y. BOT. GARDEN and fellow in geol, Columbia Univ, 05–06; Clark Univ, summers, 01 and 03; mineralogy, N. Y. State Mus, spring, 15; chemistry, Rensselaer, spring 15; Harvard Medical School, summer, 15. Instr. geol, Columbia Univ, summer, 05; sci. master, Cushing Acad, 01–03; asst. prof. zool. and geol, *Mass. Agric. Coll*, 05–10; assoc. prof, 10–17; *prof, 18–; head of dept, 10–;* N. Y. State and Vt. State geol. surveys, various summers. A. A. A. S; Nat. Geo. Soc; Geol. Soc; Paleont. Soc; Sigma Xi; Phi Kappa Phi. Geology; zoology.

Graff, Paul Weidemeyer, Univ. of Montana, Missoula, Mont. Indianapolis, Ind, Oct. 10, 80. B.S, Conn. Agric. Coll, 07; Harvard Univ, 07–09; N. Y. BOT. GARDEN and Columbia Univ, 15–16; M.A, 16. Austin teaching fellow, Harvard Univ, 07–09; instr. bot. and plant pathologist, Kansas State Agric. Coll, 09–11; mycologist, Bureau Sci, Manila, Philippines, 11–14; bot, Univ. Philippines, 12–14; *instr. bot, Univ. Montana, 16–;* botanist, Univ. Mont, Biol. Sta, summer sessions, 17 18. Am. Phytopath. Soc; fellow A. A. A. S; Bot. Soc. Am; Torrey Bot. Club. Pathology; mycology.

Graham, Margaret Alexander, Teachers Coll, Columbia Univ, N. Y. City. A.B, Cornell Univ, 08; M.A, 09; Ph.D, 12; Columbia Univ. 09–; N. Y. BOT. GARDEN, 14. Sci. teacher, Randolph Macon Woman's Coll, Lynchburg, Va; sci. teacher, *Teachers Coll*, 12–14; *instr. biol, 14–.* Bot. Soc. Am; Torrey Bot. Club. Cytology of Hepaticae.

Griffiths, David, U. S. Dept. Agric, Washington, D. C. Abaristwyth, Wales, Aug. 16, 67. B.S, S. Dak. Agric. Coll, 92; M.S, 93; Ph.D, Columbia Univ, 00; N. Y. Bot. Garden, 99–00. Teacher sci, H. S, Aberdeen, S. Dak, 93–98; prof. bot, Ariz. Agric. Coll. and botanist, Ariz. Agric. Exp. Sta, 00–01; asst. div. agrost, U. S. Dept. Agric, 01–08; agriculturist, 08–17; *agriculturist, Horticultural Investigations, U. S. Dept. Agric, 17–.* Fellow A. A. A. S; Bot. Soc. Am; Nat. Geogr. Soc; Bot. Soc. Wash; Wash. Acad. Sci; Torrey Bot. Club. Forage plants; the genus *Opuntia;* flowering bulbous stocks, etc.

Grout, Leon Everet, East Jamaica, Vt. Newfane, Vt, Sept. 14, 77. Univ. Vt, 98–02, B.S, in agric; Teachers Coll, Columbia Univ, and N. Y. Bot. Garden, 02–03. Railroad telegraph and station work three years; *owner and manager of farm at East Jamaica, Vt.* Growing of legumes.

Gruenberg, Benjamin Charles, 473 Central Park W, N. Y. City. Novoselitza, Bessarabia (Russia), Aug. 15, 75. B.S, Univ. Minn, 96; N. Y. Univ. School of Pedagogy, 01–02; N. Y. Bot. Garden, 02–06; 07–09; 10–11; A.M, Columbia Univ, 04; Ph.D, 11. Polariscopist, U. S. Laboratory, Port of N. Y, 98–02; instr, DeWitt Clinton H. S, 02–10; head dept. biol, Commercial H. S, Brooklyn, 10–14; coordinator, *Julia Richman H. S,* 14–17; *head dept. biol, 14–;* teacher evening school, N. Y. City, 02–03, 04 07; *lecturer, N. Y. Public Lecture System, 08–; lecturer science, Rand School Social Sci, 07–.* A. A. A. S; N. E. A; N. S. Voc. Ed; N. Voc. Guid. Assoc; N. Y. H. S. Teachers Assoc; N. Y. Assoc. Bio. Teachers. Plant physiology; mycorrhiza.

Hanks, Lenda Tracy, 950 Marcy Ave, Brooklyn, N. Y. N. Y. City, Jan. 1, 79. A.B, Barnard Coll, Columbia Univ, 01; A.M, 02; Adelphi Coll, Brooklyn, 03–04. Mus. aid, N. Y. Bot. Garden, 01–02; teacher sci, Adelphi Acad, 03–04; teacher biol, *Girls' H. S, Brooklyn, N. Y, 05–.* Linnean Soc. Biology.

Hare, Raleigh Frederick, Las Cruces, New Mexico. B.S, Alabama Polytech. Inst, 92; M.S, 93. Columbia Univ. and N. Y. Bot. Garden, 10. Prof. chem, N. Mexico Agric. Coll. and

chemist to the New Mexico Exp. Station, –15; *State crop reporter for New Mexico, 15–.* Plant chemistry.

Harlow, Sarah Havens, Nyack, N. Y. Florida, N. Y, Oct. 20, 67. B.S, Wellesley Coll, 91; N. Y. BOT. GARDEN, 99–01; A.M, Columbia Univ, 01. Teacher, Am. Collegiate Inst, Smyrna, Turkey, 93–96; Tuxedo Park School, Tuxedo Park, N. Y, 96–99; Randolph Colley School, Plainfield, N. J, 01–03; private tutor, Norfolk, Conn, 04–08; private tutor, Nyack, N. Y, 08–11; MUSEUM AID, N. Y. BOT. GARDEN, 11–13; *librarian, 13–.* Botany.

Harper, Roland McMillan, College Point, N. Y. Farmington, Me, Aug. 11, 78. B.E, Univ. Ga, 97; N. Y. BOT. GARDEN, 99–05; Ph.D, Columbia Univ, 05. Aid, U. S. Nat. Herb, 01, 02; botanist, Geol. Surv. Ga, 03–04; Geol. Surv. Ala, 05–06, 11–13; Geol. Surv. Fla, 08–10, 14–15; contr. New International Encyclopaedia, 14–16; *asst. agric. geogr, U. S. Dept. Agric, 17–.* N. Eng. Bot. Club; Torrey Bot. Club; fellow A. A. A. S; Soc. Am. Foresters. Phytogeography of the United States, especially of the coastal plain.

Haynes, Caroline Coventry, Highlands, N. J. N. Y. City, April 13, 58. Grad. Mrs. Sylvanus Reed's School, 76; N. Y. BOT. GARDEN, 02–07, 09–10. Torrey Bot. Club; Sullivant Moss Chapter (v. pres, 08); Wild Flower Pres. Soc. Am; N. Y. BOT. GARDEN (ann. mem.); Bot. Soc. Am; Conn. Bot. Soc. Taxonomy of Hepaticæ.

Hazen, Elizabeth Lee, 620 W. 116 St, N. Y. City. Rich, Miss, Aug. 24, 87. B.S, Indust. Inst. and Coll, Columbus, Miss, 10; Univ. Tenn, summer, 11; Mechanics Inst, Rochester, summer, 12; Univ. Va, summer, 14; Columbia Univ. and N. Y. BOT. GARDEN, 16–17; M.A, Columbia Univ, 18. Teacher sci, Jackson, Miss, H. S, 11–16; teacher sci, Low and Heywood Private School for Girls, Stamford, Conn, 17–18. Fertility in plants.

Hazen, Tracy Elliot, Barnard Coll, Columbia Univ, N. Y. City. Jericho Center, Vt, July 4, 74. A.B, Univ. Vt, 97; A.M, Columbia Univ, 99; Ph.D, 00; N. Y. BOT. GARDEN, 99–00. Dir. Fairbanks Mus. Nat. Sci, St. Johnsbury, Vt, 01–02; asst. bot,

Columbia Univ, 02–03; tutor, *Barnard Coll*, 03–07; instr, 07–10; *asst. prof*, *10* -. Fellow A. A. A. S; Torrey Bot. Club; New England Bot. Club; Vt. Bot. Club; Conn. Bot. Soc. Algae, chiefly Chlorophyceae; floral biology and organogeny.

Hedgcock, George Grant, U. S. Dept. of Agric, Washington, D. C. Augusta, Ill, Oct. 5, 63. B.S, Univ. Neb, 99; fellow, A.M, 02; Ph.D, Washington Univ, 06; Mo. Bot. Gard, 02; Mississippi Valley Lab, 07; N. Y. BOT. GARDEN, 10. Principal pub. schools, Oak, Neb, 91–93; Ruskin, Neb, 93–95; asst. bot, Univ. Neb, 99; scientific aid, *Bur. Pl. Ind*, 01; asst. pathologist, 02–08; *pathologist, 08–*. Fellow A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc; Wash. Bot. Soc. Phytopathology; fungous and mistletoe diseases of forest trees.

Henry, Florence (Mrs. Hervey W. Shimer), Mass. Inst. of Tech, Cambridge, Mass. Sacramento, Cal, Sept. 24, 79. N. Y. State Nor. School, Cortland, N. Y, 97; A.B, Cornell Univ, 01; A.M, Columbia Univ, 02; Columbia Univ. and N. Y. BOT. GARDEN, 02–03. Bos. Malacological Club; 20th Cent. Club of Bos; Cornell Women's Club of Bos; Bos. Equal Suf. Assoc. Geology; paleobotany; evolution.

Hewett, George Edward, 2353 Davidson Ave, N. Y. City. Port Jervis, N. Y, Apr. 10, 80. Nor. School, Cortland, N. Y, Diploma, 04; N. Y. Univ, 08–11; B.S, 10; M.A, 11; some graduate work since; N. Y. BOT. GARDEN, 17–18. Prin, Elnera Heights H. S, 03 07; teacher public & H. S. of N. Y, 07–; *teacher biol, Evander Childs High School, 11–*. Phytopathology.

Hewins, Nellie Priscilla, 10 Ketcham Place, Elmhurst, N. Y. Maspeth, N. Y, Jan. 20, 78. B.S, Cornell Univ, 98; Cornell Univ, 98–99; A.M, Columbia Univ, 00; Teachers Coll, Columbia Univ, 00, 07–08, 08–09 (secondary diploma, 00); Cold Spring Harbor, summer, 01; Cornell Univ, summer, 05; Alliance Francaise, Paris, summer, 03; Stern School of Languages, 03–05; N. Y. BOT. GARDEN, 99–00, 04–05; Ph.D, N. Y. Univ, 13; Pd.D, 15. Teacher sci, South Orange H. S, 01; instr. biol, *Newtown H. S, Elmhurst, N. Y*, 01 17; *first asst. biol. sci, 17–*. A. A. A. S; N. E. A; N. Y. Assoc. Biol. Teachers; Nat. Geogr. Soc; Daughters of Am. Revolution. Biology.

Hockaday, Ela, present address not known. N. Y. Bot. Garden, 05–06. Lichen flora of Texas; morphology.

Holm, Herman Theodor, Brookland, D. C. Copenhagen, Denmark, Feb. 3, 54. Grad. Copenhagen, 80; Ph.D, Catholic, 02; RESEARCH SCHOLAR, N. Y. Bot. Garden, 03. Botanist and zoologist, Danish North Pole Exped, 81-82; traveled in West Greenland as botanist and zoologist for the Danish Government, summer, 84, 85, 86; asst. bot, U. S. Nat. Mus, 88–93; U. S. Dept. Agric, 93–96. Danish, Swedish, French, German and Canadian scientific societies. Anatomy and morphology of phanerogams.

Horne, William Titus, Univ. of Cal, Berkeley, Cal. Kankakee, Ill, 76. B.S, Univ. of Neb, 98; grad. student, 98–00; fellow, Columbia Univ. and N. Y. Bot. Garden, 03–04, N. Y. Bot. Garden 17. Instr. bot. Neb. Wesleyan Univ, 98–00; instr. bot. Univ. Neb. School of Agric, summer, 99–00; asst. plant path, Estacion Cent. Agron. de Cuba, 04–07; chief dept. veg. path, 07–09; asst. prof. plant path, Univ. Cal, 09-12; *assoc. prof. 12–.* Bot. Seminar (Univ. Neb.); Am. Phytopath. Soc; A. A. A. S; Am. Genetics Assoc. Diseases of tropical plants; olive knot; root-rot of trees (*Armillaria*).

House, Homer Doliver, State Museum, Education Bldg, Albany, N. Y. Oneida, N. Y, July 21, 78. B.S, Syracuse Univ, 02; N. Y. Bot. Garden, 03–04; M.A, Columbia Univ, 04; Ph.D, 08; Technical Hochschule & Bot. Garden, Darmstadt, Ger, 10–12. Asst. bot, Columbia Univ, 02–03; sub. teacher bot, Rutgers Coll, 04; aid, U. S. Nat. Mus, Div. Plants, 04–05; Bur. Pl. Ind, 05-06; assoc. prof. bot. and bact, Clemson Coll, S. C, 06–07; AID, N. Y. Bot. Garden, 07–08; assoc. dir. and lecturer bot. and dendrology, Biltmore Forest School, 08–13; *N. Y. State Botanist, 13–.* Soc. Am. Foresters; N. Y. State Forestry Assoc; Torrey Bot. Club. Taxonomy.

Howe, Reginald Heber, Jr, Thoreau Museum, Concord, Mass. Quincy, Mass, Apr. 10, 75. Special student, Lawrence Sci. School, Harvard Univ, 98–01; RESEARCH SCHOLAR, N. Y. Bot. Garden, 09; Docteur de L'Universite, Sorbonne, 12. *Teacher sci, Middlesex School, 01–.* Am. Ornith. Soc; Boston Soc. Nat.

Hist; Nat. Geogr. Soc; Am. Entom. Soc; Royal Societies, London. Morphology; taxonomy and geographical distribution of lichens; family Usneaceae and foliose and fruticose lichens.

Hoyt, William Dana, Washington and Lee Univ, Lexington, Va. Rome, Ga, April 16, 80. A.B, Univ. Ga, 01; M.S, 04; Johns Hopkins Univ, 04–09; fellow, 08–09; Bruce fellow, 09; Ph.D, 09; N. Y. Bot. Garden (Cinchona Sta), 06; Univ. Heidelberg, 09 10; Stazione Zoologica Naples, 10; Fishers Lab, Beaufort, N. C, 03–09. Instr. bot, Rutgers Coll, 10–12; Fellow-by-courtesy, Johns Hopkins Univ, 12–15; *assoc. prof. biol, Wash. and Lee Univ, 15–; instr. bot, Woods Hole, 17–.* Fellow A. A. A. S; Bot. Soc. Am. Plant physiology; algae.

Humphrey, Clarence John, Forest Products Laboratory, U. S. Dept. Agric, Madison, Wis. Wakeman, Ohio, Mar. 3, 82. A.B. and B.S. (in forestry), Univ. Neb, 06; Cornell Univ, 07 09; N. Y. Bot. Garden, 07–08. Asst. bot. (mycology), Cornell Univ, 07–09; *office of Investigations in Forest Pathology, Bur. Pl. Ind, 09–; lecturer on timber diseases, Univ. Wis.* Fellow A. A. A. S; Am. Phytopath. Soc; Bot. Soc. Am; Wis. Acad. Sci; Sigma Xi. Mycology and pathology with reference to basidiomycetes producing decay of timber.

Humphreys, Edwin William, 11 Colonial Place, New Rochelle, N. Y. New Jersey, June 15, 83. A.B, Coll. City N. Y, 03; Columbia Univ, summer school, 04, 05; M.A, 06. N. Y. Bot. Garden (voluntary asst. to Dr. Hollick), 05–13, 16; mus. aid, 14–16; *teacher, elem. schools, N. Y. City, 03–.* Geology; paleobotany.

Irving, Mrs. Leonard (See Rennert, Rosina Julia).

Jackson, Herbert Spencer, Lafayette, Ind. Augusta, N. Y, Aug. 29, 73. A.B, Cornell Univ, 05; N. Y. Bot. Garden, 07, 08; research scholar, 17. Asst. bot. (mycology), Cornell Univ, 04–05; instr. bot, Delaware Coll, and asst. plant pathologist, Agric. Exp. Sta, Newark, Del, 05–07; Austin Teaching Fellow bot, Harvard Univ, 08–09; asst. plant path, Oregon Agric. Coll. and Exp. Sta, 09–10; prof, 10–?; *chief bot, Purdue Univ. Exp. Sta.* Fellow A. A. A. S; Bot. Soc. Am; Am.

Phytopath. Soc. Mycology; pathology and taxonomy of fungi.

Johnson, Duncan Starr, Johns Hopkins Univ, Baltimore, Md. Cromwell, Conn, July 21, 67. B.S, Wesleyan Univ, 92; Ph.D, Johns Hopkins Univ, 97; Munich, 01; N. Y. BOT. GARDEN (CINCHONA STA.), 03, 06, 10. Curator, Mus. Brooklyn Inst, 97; in charge bot, Biol. Lab, Brooklyn Inst, 96; assoc. bot, *Johns Hopkins Univ*, 98–01; assoc. prof, 01–06; *prof, 06–*. Bot. Soc. Am. (secy, 06–09); fellow A. A. A. S. (v. pres, 13); Torrey Bot. Club. Plant embryology; marine algae; plant distribution; *Cactaceae*.

Jud, Friedolina Catharina, 119 Franklin St, Jersey City, N. J. Jersey City, N. J, April 10, 80. B.S, Barnard Coll, Columbia Univ, 12; M.A, Columbia Univ, 13; N. Y. BOT. GARDEN, 13, 14; RESEARCH SCHOLAR, 15. *Lab. asst. biol, Girls' H. S, Brooklyn, N. Y, 17–*. A. A. A. S; Torrey Bot. Club; Physiographer's Club of N. Y; N. Y. Mineralogical Club. Paleobotany; geology.

Kauffman, Calvin Henry, Univ. of Michigan, Ann Arbor, Mich. Lebanon Co, Pa, Mar. 10, 69. A.B, Harvard Univ, 96; Univ. Wis, 00–01; Cornell Univ, 01–03; Univ. Mich, 03–06; Ph.D, 06; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 14. Asst. bot, Cornell Univ, 01–03; instr. bot, Univ. Mich, 03–10; asst. prof, 10–17; *pathological inspector, Federal Horticultural Board, U. S. Dept. Agric, 17–*. Bot. Soc. Am; Am. Phytopath. Soc; A. A. A. S; Am. Assoc. Univ. Professors; Mich Acad. Sci. Mycology.

Kellicott, William Erskine, College of the City of New York. Buffalo, N. Y, April 5, 78. Ph.B, Ohio State Univ, 98; Ph.D, Columbia Univ, 04; N. Y. BOT. GARDEN, 99–00. Asst. zool, Barnard Coll, 01–02; tutor, 02–05; instr, 05–06; prof. biol, Goucher Coll, 06–18; fellow, Kahn foundation for the foreign travel of American teachers, 12-13; *in charge embryological investigations, Marine Biol. Lab, Woods Hole, 15–; prof. biol, Coll. of the City of N. Y, 18–*. Fellow A. A. A. S; Soc. Nat; Soc. Zool. Embryology; general zoology.

Kelly, James Peter, State College, Pa. Hamilton, Ontario, June 9, 85. B.S, Coll. City N. Y, 06; Woods Hole, 08, 11;

Jones Scholarship, Sta. for Exp. Ev, Cold Spring Harbor, 12; N. Y. Bot. Garden, 12, 13, 14; Columbia Univ, 09–14; M.A, 14; *Princeton Univ*, 18–. Teacher pub. schools, N. Y. City, 13; *instr. bot, State Coll. Pa, 14* . Columbia Univ. Biochem. Soc; Phi Beta Kappa. Genetics.

Kennerly, Martha Mason, 230 W. 101 St, N. Y. City. White Post, Va, Nov. 5, 72. B.S, Adelphi Coll, Brooklyn, N. Y, 03; Cold Spring Harbor, summer, 07; N. Y. Bot. Garden, 11–13; Woods Hole, summer, 13; M.A, Columbia Univ, 15. Instr. biol, Adelphi Coll, 89–03; instr. biol, New Haven H. S, 03–05; instr. biol, Hunter Coll. H. S, N. Y. City, 03–11; *instr. biol, Hunter Coll, 12–*. Am. Forestry Assoc; Am. Mus. N. H; Zool. Soc. Cytology.

Kern, Frank Dunn, State College, Pa. Reinbeck, Iowa, June 29, 83. B.S, State Univ. Iowa, 04; M.S, Purdue Univ, 07; Ph.D, Columbia Univ, 11; research scholar, N. Y. Bot. Garden, 06, 07, 08, 10; fellow, Columbia Univ, 10–11; and N. Y. Bot. Garden, 10, 11. Lab. asst. animal morph. and physiol, Univ. Iowa, 02–04; special agt, *Bur. Pl. Ind*, 04, 05; *collaborator*, 07 13, *17–;* asst. and later assoc. botanist, Purdue Univ. Agric. Exp. Sta, 05–13; instr. crypt. bot, Purdue Univ, 10–12; *prof. bot, Pa. State Coll, 13* . Fellow A. A. A. S; Ind. Acad. Sci; Torrey Bot. Club; Bot. Soc. Am; Am. Phytopath. Soc; Sigma Xi; Phi Kappa Phi. Mycology; pathology; uredinology.

Kimura, Tokuzo, present address not known. Hirobuchi, Miyagiken, Japan, Dec. 2, 80. Sapparo Agric. Coll, Japan, 04; A.B, Stanford Univ, 06; Columbia Univ. and N. Y. Bot. Garden, 07 08. Tohoku Gakuin Missionary Coll, Sendai, Japan, 01–03; *Sotokufu Chugakko* (*Government Middle School*), *09–*. Biology; sex-determination in plants.

King, Cyrus Ambrose, 387 E. 5 St, Brooklyn, N. Y. Plum Tree, Indiana, June 19, 67. A.B, Indiana Univ, 93; A.B, Harvard Univ, 97; A.M, 98; Ph.D, 02; N. Y. Bot. Garden, 03–04, 05. Teacher nat. sci, H. S, Decorah, Ia, 93-96; asst. bot, Harvard Univ, 96–00; asst. bot, summer school, Harvard Univ, 97–01; Radcliff Coll, 99-00; instr, Ind. Univ, 00–02;

instr, in charge bot. biol. station, Ind. Univ, summer, 02; teacher biol, DeWitt Clinton H. S, N. Y. City, 02–07; *first asst. biol, Erasmus Hall H. S, Brooklyn, N. Y, 07–; pres. dept. bot, Brooklyn Inst, 14–.* Fellow A. A. A. S; Soc. Nat. Cent. States; Torrey Bot. Club; Bot. Soc. Am; N. Y. Assoc. Biol. Teachers. Cytology.

Kirkwood, Joseph Edward, Univ. of Montana, Missoula, Mont. Cedar Rapids, Iowa, Jan. 24, 72. A.B, Pacific Univ, Oregon, 98; special fellow biol, Princeton Univ, 98–99; A.M, 02; Columbia Univ, 99–01; Ph.D, 03; N. Y. BOT. GARDEN, 99–01, 02; RESEARCH SCHOLAR, 04; Desert Bot. Lab, Tucson, Arizona, 08–09. Asst. bot, Columbia Univ, summer school, 00; asst. biol, Teachers Coll, Columbia Univ, 00–01; instr. bot, Syracuse Univ, 01–03; assoc. prof. bot, 03–07; prof. bot. and head dept, 07; asst. bot, dept. invest, Continental-Mexican Rubber Co, 07–09; asst. prof. bot. and forestry, *Univ. Mont*, 09–10; prof. and head dept. bot. and forestry, 10–14; *prof. and head dept. bot, 14–.* Fellow A. A. A. S; Sigma Xi; Torrey Bot. Club; Bot. Soc. Am; Am. Ecol. Soc; W. Soc. Nat. Embryology; physiology; ecology.

Knight, Mrs. H. (See Brandenburg, Ellen Klapp).

Knox, Alice Adelaide, 1006 Cornelia St, Utica, N. Y. Point Pleasant, N. J, Aug. 28, 76. A.B, Smith Coll, 99; A.M, Columbia Univ, 06; N. Y. BOT. GARDEN, 04–05. Demonstr. bot, Smith Coll, 00–01; asst. bot, Barnard Coll, 03–05; asst, Cold Spring Harbor, 04; LAB. ASST, N. Y. BOT. GARDEN, 05–06; asst, Dept. Bot. Res, Carnegie Inst, 06–07; teacher, Knox School, Lakewood, N. J; prin. private school, Upper Montclair, N. J, 09–11; *prin. private school, Utica, N. Y, 11–.* A. A. A. S. Plant morphology; physiology.

Kornmann, Elise W, 609 W. 127 St, N. Y. City. N. Y. BOT. GARDEN, 00–01. Pd.M, N. Y. Univ, .05. Prin, P. S. 12, N. Y. City, 06–17; *prin, P. S. 157, N. Y. City, 18–.*

Kupfer, Elsie M, 44 W. 97 St, N. Y. City. Bayreuth, Germany, Sept. 5, 77. A.B, Barnard Coll, Columbia Univ, 99; A.M, Columbia Univ, 01; Ph.D, 07; Columbia Univ. and N. Y. BOT. GARDEN, 01. Asst. bot, Columbia Univ, summer school,

01, 02; teacher biol, L. I. City H. S, 02; teacher biol, *Wadleigh H. S*, 03–09; *head dept. biol, 09–*. Wild Flower Pres. Soc. Am; A. A. A. S; Torrey Bot. Club; N. Y. Biol. Teachers Assoc; H. S. Teachers Assoc; Barnard Bot. Club. Physiology of water storage in desert plants.

Leavenworth, George, Greenville, Miss. Ste. Genevieve, Mo, Sept. 30, 75. A.B, Univ. Missouri, 02; N. Y. BOT. GARDEN, 02–03; A.M, Columbia Univ, 03. *Connected with the firm of J. H. Leavenworth & Son, manufacturers of hardwood lumber, Greenville, Miss.* Forestry, and forestry products.

Lewis, Ivey Foreman, University, Va. Raleigh, N. C, Aug. 31, 82. A.B, Univ. N. C, 02; M. S,03; U. S. Fisheries Lab, Beaufort, N. C, 02, 05, 06, 09; Cold Spring Harbor, 04, 05; Johns Hopkins Univ, 03–08; fellow, 06–07; Bruce fellow, 07–08; Ph.D, 08; N. Y. BOT. GARDEN (CINCHONA STA.), 06; Stazione Zoologica Naples, 08; Bonn Univ, 08; Biol. Anstalt Helgoland, 08; Woods Hole, 06, 07, 10–17. Asst, Univ. N. C, 02–03; instr, summer, 04; act. prof. biol, Randolph Macon Coll, 05–06; prof, 08–12; asst. prof. bot, Univ. Wis, 12–14; prof. bot, Univ. Mo, 14–15; *Miller prof. biol, Univ. Virginia, 15–* Fellow A. A. A. S; Bot. Soc. Am; Am. Microscop. Soc; Am. Assoc. Univ. Professors. Algae.

Liebovitz, Sidney, 31 W. 89 St, N. Y. City. Coll. City N. Y, 02–05; Columbia Univ, 05–13, M.A, 12; N. Y. BOT. GARDEN, 11; research student in physical chem, Mellon Inst. of Indust. Research, Pittsburgh, Pa, 13–15; Ph.D, 15. *Special research, Mellon Inst.* Physiological chemistry.

Livingston, Burton Edward, Johns Hopkins Univ, Baltimore, Md. Grand Rapids, Mich, Feb. 9, 75. B.S, Univ. Mich, 98; Ph.D, Chicago Univ, 01; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 03. Asst. bot. lab, Univ. Mich, 95–98; instr. sci, H. S, Freeport, Ill, 98–99; asst. plant physiol, Chicago Univ, 99–04; field work, Mich. Geol. Surv, 01; collaborator, U. S. Bureau Forestry, 02; instr. biol, summer school, Eastern Ill. State Nor. School, 03; Carnegie research asst, 04; soil expert, U. S. Bureau Soils, 05–06; Desert Bot. Lab, Carnegie Inst, 06–09; prof. plant physiol, *Johns Hopkins Univ*, 09–12; *dir.*

lab. plant physiol, 12–. Fellow A. A. A. S; Am. Soc. Nat; Bot. Soc. Am; Ecol. Soc. Am; Walker prize, Boston Soc. Nat. Hist, 03. Plant physiology; ecology; soil physics.

Livingston, Mrs. Flora Virginia, Widener Memorial Library, Harvard Univ, Cambridge, Mass. N. Y. BOT. GARDEN, 04, 05.

Locke, Emily Pauline, present address not known. B.L, Smith Coll, 00; A.M, Columbia Univ, 02; N. Y. BOT. GARDEN, 02.

Lord, Mary Elizabeth (Mrs. Walter J. Dumm), 38 S. 10 St, Newark, N. J. Somersworth, N. H, Jan. 3, 81. A.B, Barnard Coll, Columbia Univ, 07; Cornell Univ, summer, 08; Columbia Univ, 11-13; M.A, 13; N. Y. BOT. GARDEN, 13. Teacher, N. Y. City schools, 04 06; teacher biol, Hunter Coll. H. S, 07–12; teacher zool. and bot, Hunter Coll, 12–14. Fertilization in *Lupinus hirsutus.*

McCormick, Florence Anna, Agric. Exp. Sta, Lincoln, Neb. Shippensburg, Pa, Dec. 21, 74. Univ. Tenn, 93–00; A.B, 97; M.S, 00; Univ. Chicago, 07–13; Ph.D, 14; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, '14. Asst. sci, Winthrop Coll, Rock Hill, N. C; asst. bot, Univ. Chicago, 09–13; *asst. prof. agric, Exp. Sta, Lincoln, Neb, 13–.* A. A. A. S; Bot. Soc. Am. Cytology of *Mucor.*

MacIntyre, Lucy, 303 W. 74 St, N. Y. City. N. Y. City, Dec. 5, 64. Miss Leverett's School, N. Y. City, 73–79; The Misses Graham School, 79–83; Dresden, Germany, 83, 84; N. Y. BOT. GARDEN, 03–04, 05, 06, 07, 08. A. A. A. S; Torrey Bot. Club; League for Political Education. Morphology of algae; general bryology.

Marble, Delia West, Bedford, N. Y. N. Y. City, 68. Special student, Columbia Univ, 97–98, 05; N. Y. BOT. GARDEN, 01–02. Torrey Bot. Club; Wild Flower Pres. Soc; N. Y. BOT. GARDEN. Private tutoring in botany.

Mathewson, Chester Arthur, 476 Eastern Parkway, Brooklyn, N. Y. Cincinnati, Ohio, Dec. 11, 78. Chicago Univ, 99; Univ. Cincinnati, 01–03; Yale Univ, 03–04; N. Y. BOT. GARDEN, 04–05; Columbia Univ, B.S, 05; A.M, 06; Ph.D, 12. Instr, Tech. School Cincinnati, 98–03; Teachers Coll, Columbia Univ, 05-06; Plainfield H. S, N. J, 06–07; H. S. of Com-

merce, N. Y. City, 07–10; instr, *Brooklyn Training School for Teachers*, 10–14; *head sci. dept, 14 ;* lect. geogr, St. Johns Coll, Brooklyn, 15. Am. Nat. Study Soc; N. Y. Assoc. Biol. Teachers; A. A. A. S. Phytogeography; economic botany.

Maxon, William Ralph, U. S. Nat. Mus, Washington, D. C. Oneida, N. Y, Feb. 27, 77. Ph.B, Syracuse Univ, 98; N. Y. BOT. GARDEN, 03, 11, 12; RESEARCH SCHOLAR, 05. ASST, N. Y. BOT. GARDEN, 98; aid crypt. bot, *Div. of Plants, U. S. Nat. Mus*, 99 05; asst. curator, 05-14; *assoc. cur. 14* . Fellow A. A. A. S; Linn. Fern Chapter (pres, 00–01); Bot. Soc. Wash; Wash. Acad. Sci; Wild Flower Pres. Soc. Am. (charter mem.). Taxonomy of ferns.

Middleton, Florence, 366 St. Nicholas Ave, N. Y. City. New London, Conn, Aug. 2, 63. Hunter Coll, N. Y. City, 85; Teachers Coll, Columbia Univ, 00–02; Barnard Coll, 02–08; Cold Spring Harbor, 04; N. Y. BOT. GARDEN, 05–06, 10–11; B.S, Columbia Univ, 10; A.M, 14. *Asst. teacher biol, Wadleigh H. S, N. Y. City, 04–*. Wild Flower Pres. Soc. Am. Botany; morphology; the genus *Saponaria*.

Miller, Fred Anderson, Greenfield, Ind, R. R. No. 6. Brooklyn, Ind, Sept. 5, 78. B.S, Purdue Univ, 08; M.S, 12; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 13. Botanist, *Eli Lilly and Co,* Indianapolis, Ind, 08–16; *supt, farm and medicinal plant garden, 16–.* A. A. A. S; Bot. Soc. Am; Ind. Acad. Sci. Medicinal plants with especial reference to improvement and commercial production.

Millspaugh, Charles Frederic, Field Mus. of Nat. Hist, Chicago, Ill. Ithaca, N. Y. June 20, 54. Cornell Univ, 72–75; M.D, N. Y. Homeop. Med. Coll, 81; N. Y. BOT. GARDEN, 03–. Prof. bot, W. Va, 91–92; *curator, dept. bot, Field Mus. Nat. Hist, 94–; professorial lect. bot, Chicago Univ, 95–; prof. med. bot, Chicago Homeop. Med. Coll, 96–; advisory trustee, Ill. State Mus.* Mem. Pan Am. Commission Med. Plants, 99–01; Wild Flower Pres. Soc. Am. (charter mem, *dir, 02–, pres. 14–*); Mexican Med. Soc. (hon. fellow); Brazilian Med. Soc; Torrey Bot. Club; fellow A. A. A. S; Soc. Nat. Cent. States; Sigma Xi; Geogr. Soc. Chicago; Ill. Acad. Sci; editor, Homeop. Recorder, 89–90.

Studied at various times in herbaria, N. Y. Bot. Garden and other Am. herbaria, Kew, British Mus. Nat. Hist, Linnaean Soc, Owen's Coll, Manchester, Leyden, Berlin, Praag, Vienna, Florence, Geneva, Tokio, Hongkong, Manila, Singapore, Buitenzorg, Peradeniya, Calcutta, Munich, Rio Janeiro, Havana, Jamaica, and Paris. Taxonomic botany; flora of the West Indies and Yucatan.

Molwitz, Ernestine, 88 E. 165 St, N. Y. City. A.B, Columbia Univ, 02; N. Y. Bot. Garden, 01–03. Plant anatomy and physiology.

Montgomery, Mrs. Thomas H, Jr. (See Braislin, Anna Priscilla).

Mook, Charles Craig, 28 Warren Ave, Palisade, N. J. Metuchen, N. J, May 7, 87. Columbia Univ, 09–15; B.S, 12; A.M, 14; Ph.D, 15; New York Botanical Garden, 13. Asst. geol, Columbia Univ, summer session, 12; instr. geol, Rutgers College, summer session 15, 16; lect. geol, *Barnard College*, 15–16; and *instructor, 16–; research asst. vertebrate paleontology, Am. Museum of Nat. Hist, 12–*. New York Physiographer's Club; Am. Paleontological Soc; fellow N. Y. Acad. Sci; A. A. A. S. Geology; paleontology; paleobotany.

Mook, Mrs. Charles Craig (see Raeder, Ruth Weir).

Mulford, Fanny Augusta, 127 Fulton Ave, Hempstead, N. Y. Nevada City, Cal, Sept. 20, 55. N. Y. Bot. Garden, 02 03. Wild Flower Pres. Soc. Am. (charter mem.); Torrey Bot. Club. Flora of Long Island.

Muller, Theodore, 109 W. 36 St, N. Y. City. Berlin, Germany, Dec. 19, 83. Coll. City N. Y, 98–02; Columbia Univ, 06–07, 12–15; M.A, 15; N. Y. Bot. Garden, 14. Teacher sci, H. S, Pampauga, Philippines, 04 06, 07–10; curator Indust. Mus, Bureau Educ, Manila, 10–12. Etiology of smuts.

Murrill, William Alphonso, N. Y. Bot. Garden, N. Y. City. Campbell County, Virginia, Oct. 13, 69. Virginia Polytechnic Inst, agric. course, 86; B.S, and mechan. course, 87; B.S, Randolph-Macon Coll, 89; A.B, 90; A.M, 91; Ph.D, Cornell Univ, 00; N. Y. Bot. Garden, 01–04. Prof. nat. sci, Bowling Green Sem, Virginia, 91–93; prof. nat. sci, Wesleyan Female Inst, Virginia, 93–97; scholar in bot, Cornell Univ, 97–98; asst.

bot, Cornell Univ, 98–99; asst. crypt. botanist, 99–00; teacher biol, DeWitt Clinton H. S, N. Y. City, 00–04; ASST. CURATOR, N. Y. BOT. GARDEN, 04–05; FIRST ASST, 06–07; *asst. director, 08–*. Sigma Xi; Torrey Bot. Club; Bot. Soc. Am; Am. Phytopath. Soc; fellow N. Y. Acad. Sci; *editor, Mycologia;* EDITOR, Jour. N. Y. BOT. GARDEN, 06–08; assoc. editor, Bull. Torrey Bot. Club and Torreya, 03–10. Mycology; taxonomy of the higher fungi.

Nelson, Edgar, 2405 Chestnut St, Ft. Worth, Texas. N. Y. City, Dec. 23, 85. B.A, Cornell Univ, 12; Columbia Univ, and N. Y. BOT. GARDEN, 13–14. Lab. asst. in chemistry, Univ. Buffalo, 05–06; student asst, Buffalo Bot. Gardens, 06–07; field agent, Penn. Chestnut Bark Disease Com, 12–13; asst. Station of Experimental Evolution, Cold Spring Harbor, L. I, 13; asst. plant pathologist, Florida Agric. Exp. Sta, 14; asst, nursery inspector, deputy state inspector for Florida, 15; U. S. agent for eradicating citrus canker in La, 16; asst. in Sugar Exp. Sta, New Orleans, 17; deputy inspector of orchards and nurseries for Texas, 17–18; *teacher, North Side High School, Fort Worth, Texas, 18–*. Bot. Soc. Am; A. A. A. S; Am. Phytopath. Soc; Am. Assoc. Forestry; Torrey Bot. Club; Nat. Geog. Soc. Mycology; plant pathology; entomology.

Nishimura, Makoto, Columbia Univ, N. Y. City. Shimano, Japan, Mar. 26, 83. A.B, Hiroshima Coll, 11; Imperial Univ, 11–12; Columbia Univ, 16–; N. Y. BOT. GARDEN, 17–. *Biologist, Medical Coll, Mukden, Manchuria, 12–*. Pathology.

Nixon, Ernest Leland, State College, Pa. Swan, Ohio, 83. Ohio Univ, 08–12, B.S in Educ, 12; M.S, 15; Columbia Univ, 15–17; N. Y. BOT. GARDEN, 17. Asst. agric, Univ. Ohio, 12; asst. botanist, Ohio Exp. Sta, Wooster, 12 14; asst. bot, Ohio Univ, 15; asst. bot, Columbia Univ, 17; *extension pathologist, Penn. State Coll, 17–*. A. A. A. S; Am. Phytopath. Soc; Sigma Xi. Plant pathology; genetics.

Orton, Clayton Roberts, State College, Pa. E. Hardwick, Vt, April 1, 85. B.S, Univ. Vt, 09; Purdue Univ, 11–13; M.S, 15; Columbia Univ, 16–17; N. Y. BOT. GARDEN, 16–17; RESEARCH SCHOLAR, 17. Special Agent, Bur. Pl. Ind. at Burlington, Vt,

09–10; asst. plant path, Univ. Wis, 10; asst. botanist, Purdue Univ, Agric. Exp. Sta, 10–12; asst. prof. bot, *Pa. State Coll*, 13–15; *assoc. prof, 15–; collaborator, Bur. Pl. Ind, 13–*. Fellow A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc; Ind. Acad. Sci; Am. Forestry Assoc; Torrey Bot. Club; Sigma Xi. Phytopathology; mycology; the genus *Allodus*.

Overholts, Lee Oras, State College, Pa. West Elkton, Ohio, June 22, 90. Miami Univ, 07–13; A.B, 12; Washington Univ, 12–15; Ph.D, 15; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 12. Instr. bot, *Pa. State College*, 15–17; *asst. prof, 17–*. Sigma Xi. Mycology; forest pathology.

Palliser, Helen Letitia, Poughkeepsie, N. Y. Bridgeport, Conn, May 4, 82. A.B, Barnard Coll, 05; Teachers Coll, Columbia Univ, 03–05; A.M, Columbia Univ, 06; N. Y. BOT. GARDEN, 05–06; M.D, Cornell Univ. Med. Coll, 14; interne, Bellevue Hospital, 14–16. Asst. biol, Vassar Coll, 06–10; medical practicioner, Poughkeepsie, 16–18; *health officer, Poughkeepsie, 18–*. A. O. A; N. Y. State Med. Assoc; Dutchess-Putnam Med. Soc. Mycology.

Pennington, Leigh H, Syracuse Univ, Syracuse, N. Y. Macon, Mich, Oct. 26, 77. Univ. Mich, 04–09; A.B, 07; Ph.D, 09. Instr. bot, Northwestern Univ, 09–10; field investigator, Mich. Geol. and Nat. Hist. Surv, 10; asst. prof. bot, Syracuse Univ, 10–12; assoc. prof, 12–14; expert in forest path, Bur. Pl. Ind, summer, 11, 12; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 13; *prof. bot, N. Y. State Coll. of Forestry, Syracuse Univ, 14–*. Fellow A. A. A. S; Bot. Soc. Am; Am. Phytopath. Soc; Am. Forestry Assoc; N. Y. State For. Assoc; Am. Civic Assoc; Am. Genetic Assoc. Mycology; plant pathology.

Picard, Maurice, 97 W. 163 St, N. Y. City. Nyack, N. Y, July 18, 90. A.B, Columbia Univ, 10; A.M, 11; Wm. Mitchell Fellow, 10–11; N. Y. BOT. GARDEN, 12; Golden Smith Fellow bot, Cornell Univ, 12–13; student, General Theolog. Sem, 14–16; Mayo Fellow, 16–17. Instr, Lincoln Univ, Pa, 11–12; asst. prof. bot, Middlebury Coll, Vt, 13–14; *priest in charge St. Alban's Church (P E.), N. Y. City, 17–*. A. A. A. S. Cytology.

Pond, Raymond Haines, deceased July 26, 11. Topeka, **Kan**sas, March 3, 75. B.S, State Agric. Coll. Kansas, 98; M.S, 99; Ph.D, Univ. Mich, 02; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 05, 06, 07; Bonn and Strass, 07–08. Asst. bot, Kan. State Agric. Coll, 95–98; asst. chem, 97–98; asst. in charge of herb, Univ. Mich, 98–99; asst. plant physiol, 99–00; spec. investigator, Bur. Fisheries, 99-00, 01; asst. bot. and path, Maryland Agric. Coll. and Exp. Station, 00-01; instr. chem. and biol, H. S, Sterling, Ill, 02–03; prof. bot. and pharmacog, and director lab, Northwestern Univ, 03–07; asst. plant physiol, Chicago, summer, 06; biologist, Metropolitan Sewerage Commission, N. Y. City, 08–09; plant pathologist, Texas Experiment Station, 09–11. Fellow A. A. A. S; Bot. Soc. Am; Bot. Cent. States; Am. Phytopath, Soc; Sigma Xi; Am. Soc. Biol. Chem. (charter mem.). Plant physiology.

Quero, Felix Gallego, Alicante, Spain, 46 Cid. Madrid, Spain, Feb. 12, 93. Ingeniero de Montes in Escuela de Ingenieros de Montes, Madrid, Spain, 16; sent by Spanish Gov. to U. S. for six months. N. Y. BOT. GARDEN, 17. Genetics; pathology.

Raeder, Ruth Weir (Mrs. Charles C. Mook), 28 Warren Ave, Palisade, N. J. Wilkes-Barre, Pa, April 4, 87. B.A, Wellesley College, 08; M. A, 11; Mass. Inst. Tech, 08–11; Columbia Univ, 12 14; NEW YORK BOTANICAL GARDEN, 13. Asst. geol, Wellesley College, 08–11; asst. geol, Barnard College, 12–14. Paleobotany.

Rand, Edith Edwina, 320 Central Park West, N. Y. City. Norwich, Conn. A.B, Smith Coll, 99; fellow, 99–00; Woods Hole, fellow zool, 00; fellow bot, 01; N. Y. BOT. GARDEN, 01–02; A.M, Teachers Coll, Columbia Univ, 02. Lab. asst. zool, Smith Coll, 97–00; teacher biol. sci, Horace Mann H. S, N. Y. City, 02–07. Botany.

Rand, Frederick Vernon, Bureau of Plant Industry, Washington, D. C. Barnet, Vt, March 16, 83. B.S, Univ. Vt, 08; M.S, 11; Johns Hopkins Univ, 12–13; Columbia Univ, 13–14; N. Y. BOT. GARDEN, 14. Sci. asst, Bur. Pl. Ind, 08 13; collaborator, 13–14; asst. bot, Columbia Univ, 13–14; *asst. pa-*

thologist, Lab. Pl. Path, Bur. Pl. Ind. 14– Am. Phytopath. Soc; Bot. Soc. Wash; Bot. Soc. Am; Vt. Bot. Club; A. A. A. S. Plant pathology; bacteriology; plant physiology; cytology.

Rea, Paul Marshall, The Charleston Museum, Charleston, S. C. Cotuit, Mass, Feb. 13, 78. Woods Hole, 98–99; A.B, Williams Coll, 99; Columbia Univ. and N. Y. BOT. GARDEN, 99–00; A.M, Williams Coll, 01; Columbia Univ, 02–03. Asst. biol, Williams Coll, 00–02; field asst, Bur. Forestry, U. S. Dept. Agric, 02, 03; instr, Woods Hole, 06–11; prof, Coll. Charleston, 03–14; *dir, Charleston Mus, 03–; prof. embryol. and physiol, S. C. Med. Coll, 11* . Am. Assoc. Mus (secy, 07–17); fellow A. A. A. S; *editor, Bull. Charleston Mus, 03–;* contr. from Charleston Mus; Proc. Am. Assoc. Mus, 07–17; Compiler, Directory of Am. Mus; *Vice-director, War Savings for South Carolina, 17–.* Museum administration.

Redding, Charles Harold Edgar, 2117 Daly Ave, N. Y. City. New Orleans, La, 59. Collegiate Inst, London, Canada; Christ Church, Cambridge, Eng; N. Y. BOT. GARDEN, 17–. *Editor of Brass World & Hub. Writer on trade and technical subjects.* Garden crops.

Reed, Merril Virgil, Lincoln, Neb. Crete, Neb, Feb. 23, 94. Univ. Neb, 10–15; A.B, 14; B.S, 15; N. Y. BOT. GARDEN, 16, 17; RESEARCH SCHOLAR, 16. Teacher sci. and latin, Tecumseh, Neb, 15–16; asst. bot, Columbia Univ, 16–17; *lieutenant in U. S. military service, 17–.* Genetics.

Reid, Katherine Willess, 44 Vernon Ave, Mt. Vernon, N. Y. Mount Vernon, N. Y, Mar. 4, 89. A.B, Vassar Coll, 12; A.M, Columbia Univ, 13; N. Y. BOT. GARDEN, 12, 13, 14. Heredity and variegation in *Abutilon* and *Ligustrum.*

Rennert, Rosina Julia (Mrs. Leonard Irving), Whitestone, N. Y. N. Y. City, July 8, 78. A.B, Hunter Coll, N. Y. City, 97; A.B, Barnard Coll, Columbia Univ, 01; A.M, 02; N. Y. BOT. GARDEN, 99–01, 02 04. Asst. teacher biol, Washington Irving H. S, N. Y. City, 02–03; Wadleigh H. S, N. Y. City, 03–07. A. A. A. S. Plant anatomy; physiology.

Robinson, Charles Budd, deceased Dec. 5, 13. Pictou, Nova Scotia, Oct. 26, 71. A.B, Dalhousie, Halifax, 91; Cambridge,

Eng, 97–98; Christ's Coll, 98–99; Columbia Univ. and N. Y. Bot. Garden, 03–06; Ph.D, Columbia Univ, 06. Teacher, Kings County Acad, N. S, 92–93; Pictou County Acad, 93–97, 99–03; night schools, N. Y. City, 03–05; asst. curator, N. Y. Bot. Garden, 06–07, 12; econom. bot, Bureau of Science, Phil. Govt, 08–11, 12 13. Torrey Bot. Club; Bot. Soc. Am; Nova Scotian Inst. Sci; Sigma Xi. Systematic botany.

Robinson, Winifred Josephine, Women's Coll. of Delaware, Newark, Del. Johnstown, Mich, Oct. 17, 67. Mich. State Nor. Coll, 92; Mich. Agr. Coll, summer, 94; B.S, Univ. Mich, 99; B.Pd, 99; Woods Hole, summer, 99, 00; N. Y. Bot. Garden, 02, (Cinchona Sta.), 04, 07–08, 11, 12; research scholar, 03; Berlin Univ. Herb, Germany, summer, 05; Hawaiian Is, 09; M.A, Columbia Univ, 04, Ph.D, 11; M.Pd, Mich. State Nor. Coll, 13. Instr. training dept, Mich. State Nor. Coll, 03–05; lab. asst, N. Y. Bot. Garden, 07–08; instr. biol, Vassar Coll, 00–12; prof. bot, 12 13; *dean Women's Coll. Del, 14–.* Fellow A. A. A. S; Am. Soc. Nat; Bot. Soc. Am; Torrey Bot. Club; Nat. Inst. Social Sci; Phila. Acad. Sci; Nat. Arts Club. Plant morphology; taxonomy of ferns.

Rose, Anton Richard, New York Post Grad. Med. School and Hosp, N. Y. City. Washington Co, Minn, Feb. 22, 77. Gustavus Adolphus Coll, 99–00; Univ. Minn, 00–04; B.S, 04; Yale Univ. (Grad. School), 07–08; M.S, 11; Columbia Univ, Dept. Biol. Chem, 10 12; Ph.D, 12; N. Y. Bot. Garden, 10–11. Student asst. chem, Univ. Minn, 01–04; chemist inspector city engineers office, Minneapolis, 04; instr. chem, N. H. Coll. Agric. and Mech. Arts, 04–06; asst. chem, N. Y. Agric. Exp. Sta, 06–07, 08–10; asst, Dept. Biol. Chem, Columbia Univ, 10–12; chemist, Pearson-Dunn Research Fund, 12 16; *assoc. path. chem, Dept. Lab, N. Y. Post Grad. Med. School and Hosp, 16–.* Am. Chem. Soc; Soc. Biol. Chem; Soc. Exp. Biol. and Med; Sigma Xi. Biological chemistry; nutrition; status of ash constituents in the life history of plants and their relation to animal nutrition; chemistry of bacteria; chemistry and nutritional value of tropical fruits.

Rout, Grover Cleveland, Dept. of Agric, Central Experimental Farm, Ottawa, Canada. Gee, Ky, Dec. 5, 84. B.S.A, Ky. State Univ, 11; M.S, 13; N. Y. BOT. GARDEN, 16. Asst. biol, Animal Husbandry Div, Ky. Exp. Sta, 11-14; tobacco inspector, Dominion Dept. Agric, 14–15; supt. Harrow Tobacco Sta, Dominion Dept. Agric, 15; *plant breeder and pathologist, Dominion Dept. Agric, 17–.* Alpha Zeta Agric. Frat; A. A. A. S; Corresponding mem. Ky. Acad. Sci. Genetics and plant pathology, with special reference to *Nicotiana.*

Rubrecht, William Keller, present address not known. A.B, Muhlenberg Coll, 01; N. Y. BOT. GARDEN, 02. Algae; fungi.

Sage, Lillian Belle, deceased. Norwich, N. Y. A.B, Mt. Holyoke Coll, Mass, 01. N. Y. BOT. GARDEN, 06–09. Teacher biol, Washington Irving H. S, N. Y. City, 02–09; head dept. biol, 09. Flora of Chenango Co, N. Y.

Schear, Edward Waldo Emerson, 107 West Park St, Westerville, O. Canal Dover, O, Oct. 31, 80. Otterbein Coll, 02–07; A.B, 07; Columbia Univ, summer, 08, 12, 13, 14; A.M, 15; Ohio State Univ, summer, 07, 16; N. Y. BOT. GARDEN, 17. Prof, Westfield Coll, 07–12; *prof. biol, Otterbein Coll, 12–.* A. A. A. S; Ohio Acad. Sci; Assoc. Ohio Teachers Math. and Sci. Human physiology; genetics.

Schwartz, Edith (see Clements, Edith (Schwartz)), Tucson, Arizona.

Schwarze, Carl Alois, 8610 Ferriss St, Woodhaven, N. Y. Brooklyn, N. Y, Sept. 27, 86. B.S. (in agric.), Univ. Mo, 09; Columbia Univ. and N. Y. BOT. GARDEN, 09–12; A.M, Columbia Univ, 12; Rutgers Coll, 16–18. Student asst. bot, Univ. Mo, 09; asst. bot, Columbia Univ, 11–12; asst. plant pathologist, N. J. Agric. Exp. Sta, 12 18; *in U. S. military service.* Torrey Bot. Club; Am. Phytopath. Soc; Bot. Soc. Am; Columbia Univ. Biochem. Assoc; A. A. A. S; New Brunswick Sci. Soc. Mycology; pathology and physiology of fungi; parasitic fungi of New Jersey.

Scott, George Gilmore, Coll. of City of New York, N. Y. City. Geneseo, N. Y, May 3, 73. A.B, Williams Coll, 98; A.M, 99; Woods Hole, summer, 97, 98; N. Y. BOT. GARDEN, 99; Co-

lumbia Univ, 99–02, 11–13, Ph.D, 13. Asst. biol, Williams Coll, 98 99; asst. collector, Woods Hole, 99; asst, N. Y. State Mus, summer, 00; sci. asst, Biol. Lab, U. S. Bur. Fisheries, Woods Hole, 02–11; investigator, 12; tutor, *Coll. City N. Y*, 01–05; instr, 05–13; *asst. prof. biol. and chairman of dept.* Fellow A. A. A. S; Am. Soc. Zool; Am. Soc. Nat; hon. mem, Associated Physicians of L. I; fellow, N. Y. Zool. Soc; Soc. for Exp. Biol. and Med; Phi Beta Kappa. Plant physiology; farming.

Seaver, Fred Jay, N. Y. Bot. Garden, N. Y. City. Webster Co, Iowa, 77. Chicago Univ, summer, 01; B.S, Morningside Coll, Iowa, 02; scholar, State Univ. Iowa, 02–03; special asst. to Dr. Arthur, Purdue Univ, Agric. Exp. Station, spring, 03; fellow, State Univ. Iowa, 03–04; M.S, 04; Ph.D, 12; expl. exped. N. Mexico, State Univ. Iowa, spring, 04; fellow, Columbia Univ, 06–07 and N. Y. BOT. GARDEN, 06 07. Instr. bot, State Univ. Iowa, summer, 03, 04; asst. bot, 04–05; instr. biol, Iowa Wesleyan Univ, 05 06; prof. biol, 06; asst. prof. bot, N. Dak. Agric. Coll. and mycologist agric. exp. station, 07–08; DIRECTOR OF THE LABORATORIES, N. Y. BOT. GARDEN, 08 11; *curator, 12–*. Mrs. William Larrabee research prize, 04; Torrey Bot. Club; Bot. Soc. Am; Columbia Univ. Biochemical Assoc; Sigma Xi; *assoc. editor, Mycologia, 09–;* EDITOR, JOUR. N. Y. BOT. GARDEN, 11–12. Mycology; phytopathology; taxonymy; morphology and physiology of Ascomycetes.

Selby, Augustine Dawson, Ohio Agric. Exp. Station, Wooster, Ohio. Athens Co, Ohio, Sept. 2, 59. B.S, Ohio State Univ, 93; N. Y. BOT. GARDEN, 03 04. Supt. schools, Huntington, W. Virginia, 84 86; principal, H. S, Ironton, Ohio, 86–87; teacher bot, H. S, Columbus, Ohio, 90–94; botanist and chemist, *Ohio Agric. Exp. Station*, 94–02; *botanist, 02–*. Fellow A. A. A. S; Bot. Soc. Am; Bot. Cent. States; Ohio Hort. Soc; Ohio Acad. Sci. (pres, 01); Columbus Hort. Soc. (secy, 88–89, 91–94); St. Louis Acad. Sci; Torrey Bot. Club; Am. Phytopath. Soc. Plant pathology.

hear, Cornelius Lott, U. S. Dept. of Agric, Washington, D. C. Coeymans Hollow, N. Y, March 26, 65. N. Y. State Nor. School, Albany, N. Y, 88; scholar, Univ. Neb, 94–97; B.S, 97; fellow, 97–98; A.M, 01; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 03; Ph.D, George Washington Univ, 06; studied in various European laboratories and herbaria, 05, 12. Spec. field agt, Div. Agrost, *U. S. Dept. Agric*, summer, 95, 96, 97; asst. agrost, 98–01; asst. path, 01–02; *path, 02–*. Fellow A. A. A. S; Bot. Soc. Am; Wash. Acad. Sci; Wash. Biol. Soc; Bot. Soc. Wash; Wild Flower Pres. Soc. Am. (chart. mem.); Am. Phytopath. Soc. (chart. mem.) (*secy-treas, 09–*); International Assoc. Bot; Sigma Xi; editor, phytopath. and myc, revised edition, Century Dict; *assoc. editor, Mycologia; coeditor, Phytopathology*. Plant pathology; mycology; taxonomy of Pyrenomycetes.

himer, Hervey Woodburn, Mass. Inst. of Technology, Cambridge, Mass. Martin's Creek, Pa, April 17, 72. Gettysburg, 91–93; A.B, Lafayette Coll, 99; A.M, 01; Ph.D, Columbia Univ, 04; N. Y. BOT. GARDEN, 02–03; Harvard Univ, 04–05; hon. Sc.D, Gettysburg, 16. Tutor, mod. lang, Lafayette Coll, 99–01; asst. paleont, Columbia Univ, 02–03; non. res. lecturer stratig. geol, *Mass. Inst. Tech*, 03; instr, 03–08; asst. prof. paleontology, 08–12; *assoc. prof, 12–*. Fellow A. A. A. S; Boston Soc. Nat. Hist; Geol. Soc. Am; Am. Acad. Arts and Sci; Boston Malacolog. Club; Boston Geol. Soc; Nat. Geogr. Soc; 20th Cent. Club of Boston; Sigma Xi. Geology; paleobotany; evolution.

himer, Mrs. Hervey Woodburn (See Henry, Florence).

hoemaker, Cornelia Janney, Lincoln, Va. A.B, Swarthmore Coll, 94; N. Y. BOT. GARDEN, 01–02. Instr, Friends' Seminary, N. Y. City, 97–09. Plant physiology.

hreve, Forrest, Desert Lab, Tucson, Arizona. Easton, Md, July 8, 78. A.B, Johns Hopkins Univ, 01; Ph.D, 05; Bruce fellow, 05–06; HON. ASST, N. Y. BOT. GARDEN (CINCHONA STA.), 05–06. Instr, Biol. Lab, Cold Spring Harbor, 04–05; assoc. prof. bot, Woman's Coll. Baltimore [Goucher Coll.], 06–08; *Carnegie Inst. Wash, Desert Lab, Tucson, Arizona, 08–*.

Torrey Bot. Club; Bot. Soc. Am; Ecol. Soc. Am; Assoc. An Geog; Am. Soc. Mat; Soc. Am. Foresters; fellow A. A. A. S Plant geography; physiology.

Slater, Florence Wells, Women's Univ. Club, 106 East 52 St N. Y. City. Salisbury, N. C, Oct. 16, 65. B.S, Cornell Univ 00; N. Y. BOT. GARDEN, 00–01. *Teacher biol, Washington Irving H. S, N. Y. City.* A. A. A. S; Biol. Soc. H. S. Teachers; Sigma Xi.

Slosson, Margaret, 140 W. 55 St, N. Y. City. Paris, France N. Y. BOT. GARDEN, 02–03; 04. MUS. AID, N. Y. BOT. GARDEN, 11–14; ASST. CUR, 14–17. Linnaean Fern Chapter (secy 00–01); Torrey Bot. Club. Pteridology.

Stevenson, Mrs. F. (See Berman, Florence Julia).

Stewart, Eleanor Grace, 449 W. 123 St, N. Y. City. Johnstown Pa, Apr. 6, 77. State Nor. School, Indiana, Pa, 95-97 Teachers Coll, Columbia Univ, 09–11; B.S, 11; Columbia Univ, 13–15; M.A, 15; N. Y. BOT. GARDEN, 14–15. Grad teacher, Johnstown, Pa, 97-09; *sci. teacher, Miss Chapin' School for Girls, New York City, 11–.* Torrey Bot. Club Cytology of the cacti.

Stewart, Lilian, present address not known. Carlton Coll; N Y. BOT. GARDEN, 04–05. Plant physiology.

Stewart, Ralph Randles, Rawalpindi, India. West Hebron, N Y, Apr. 15, 90. A.B, Columbia Univ, 11; Columbia Univ 14–16; Ph.D, 16; N. Y. BOT. GARDEN, 14–16. Student asst Columbia Univ, 08–11; sci. teacher, Gordon Coll, Rawalpindi India, 11 14; asst. bot, Columbia Univ, 14–16; *prof. sci, Gordon Coll, Rawalpindi, India, 17–.* Phi Beta Kappa; Sigma Xi; Bot. Soc. Am; Torrey Bot. Club. Taxonomy of the phanerogams of western Tibet.

Stewart, Mrs. Ralph Randles (See Darrow, Isabelle Caroline).

Stockard, Charles Rupert, Cornell Univ. Medical Coll, N. Y City. Washington Co, Miss, Feb. 27, 79. B.S, Miss. Agric and Mech. Coll, 99; M.S, 01; N. Y. BOT. GARDEN, 04–05 Ph.D, Columbia Univ, 07; Naples, 10; Munich, 11, 12. Asst zool, Columbia Univ, 05–06; asst. microscop. anat, *Cornell Medical Coll,* 06–08; instr, 08 09; asst. prof. embryol. an

exper. morph, 09–11; *prof. anat, 11–*. Fellow A. A. A. S; Am. Assoc. Anat; Am. Soc. Nat; Am. Soc. Zool; Soc. Exper. Med. and Biol. Cytology of secretion in plant glands; experimental morphology and embryology of animals.

Stout, Arlow Burdette, N. Y. Bot. Garden, N. Y. City. Jackson Centre, Ohio, Mar. 10, 76. Diploma, State Normal School, Whitewater, Wis, 03; Univ. Wis, 07–11; A.B, 09; N. Y. BOT. GARDEN and Columbia Univ, 11 12; Ph.D, 13. Teacher, public schools, Wis, 96–98, 00–01; teacher, H. S, Baraboo, Wis, 03–07; asst. bot, Univ. Wis, 08–09; instr. bot, Univ. Wis, 09–11; *director of the laboratories*, N. Y. BOT. GARDEN, *11–*. Phi Beta Kappa; Sigma Xi; Torrey Bot. Club; Am. Nat; Wis. Acad. Sci; A. A. A. S; Am. Phytopath. Soc; Bot. Soc. Am. Cytology; genetics; phytopathology.

Stover, Wilmer Garfield, Ohio State University, Columbus, Ohio. Hancock Co, Ohio, Oct. 3, 81. A.B, Miami Univ, 09; A.M, 10; N. Y. BOT. GARDEN, 10; Univ. Wis, summer, 13, 14. Asst. bot, Miami Univ, 07–09; instr, 09–10; sub. instr. bot, Ohio State Univ, 10–11; asst. prof. bot, Okla. A. and M. Coll, 11–12; instr. bot, *Ohio State Univ*, 12–14; *asst. prof, 14–*. Phi Beta Kappa; Bot. Soc. Am; Am. Phytopath. Soc; Ohio Acad. Sci. Plant pathology; mycology.

Stowell, Willard Allen, 140 Kent St, Trenton, N. J. Bordentown, N. J, May 17, 62. Diploma, N. J. Nor. School, Trenton, 82; B.S. and diploma biol, Teachers Coll, Columbia Univ, 12; Columbia Univ, 12–18; M.A, 18; N. Y. BOT. GARDEN, 14 18. Prin, P. S, Salem, N. J, 83 84; prin, P. S, Ramsey, N. J, 86–05; supervising prin, Hohokus Twp, 97–05; *instr. sci, H. S, Elizabeth, N. J, 05–*. Torrey Bot. Club; A. A. A. S; Am. Fern Soc. Oak hybrids of Cliffwood, N. J.

Streeter, Stella Georgiana, 108½ Clinton Avenue, Jersey City, N. J. Cummington, Mass, Aug. 6, 74. B.L, Smith Coll, 98; N. Y. BOT. GARDEN, 02–03; M.A, Columbia Univ, 03; Teachers Coll, Columbia Univ, master's diploma, 03; Bermuda Biol. Lab, 05; Cold Spring Harbor, 06, 08, 10; Cornell Univ, 09; fellow, Smith Coll, 10–11. Head dept. sci, H.S, Hempstead, N. Y, 99–02; teacher biol, H. S, Trenton, N. J,

04–07; *teacher biol, H. S, Jersey City, N. J, 07–*. A. A. A. S. Plant physiology; marine algae; genetics.

Struys, Mrs. Johan D. (See Evans, Helena).

Sumstine, David Ross, Peabody H. S, Pittsburgh, Pa. Somerset, Pa, Jan. 21, 70. A.B, Thiel Coll, Greenville, Pa, 90; Luth. Theol. Sem, Chicago, 91–92; Chicago Univ, 03; M.S, Univ. Pittsburgh, 08; Sc.D. (hon.), Pa. State Coll, 10; RESEARCH SCHOLAR, N. Y. BOT. GARDEN, 09, 10, 12. Prin, Ligonier pub. schools, 93–94; supt, Apollo pub. schools, 94–99; Kittanning pub. schools, 99–05; Turtle Creek pub. schools, 05–09; Pittsburgh H. S, prin. East High Div, and teacher sci, 09–12; *prin, Peabody H. S, 12–; asst. bot, Carnegie Museum, Pittsburgh, 03–*. Fellow A. A. A. S; Bot. Soc. W. Pa. (pres, 06–07); Torrey Bot. Club; Pittsburgh Acad. Sci. and Arts (pres. ped. sec, 14–16); Assoc. Sec. Schools upper Ohio Valley (pres. 15–16); Educ. Assoc. (pres, H. S. Dept, 18–19). Mycology; pathology; *Mucorales* and *Hyphomycetes* of North America.

Taistra, Sophie Amy, 1020 Garden St, Hoboken, N. J. Krakow, Austria, April 2, 92. B.A, Hunter Coll, 14; N. Y. BOT. GARDEN, 15 17. Asst. teacher biol, H. S. Commerce, N. Y. City, 14–16; asst. teacher biol, Yonkers H. S, 16–17; *teacher biol, H. S, Englewood, N. J, 17–*. Torrey Bot. Club. Genetics; cytology.

Tang, Young-Lee, present address not known. B. S, Columbia Univ, 13; A.M, 14; N. Y. BOT. GARDEN, 12. Plant breeding.

Tenopyr, Mrs. Lillian A. (See Umaceny, Lillian A.).

Thom, Charles, Bureau of Chemistry, U. S. Dept. Agric, Washington, D. C. Minonk, Ill, Nov. 11, 72. A.B, Lake Forest Coll, 95; A.M, 97; Mo. State Univ, 97–99; Ph.D, 99; Woods Hole, summer, 97; Bur. Pl. Ind, Washington, D. C, summer, 01; Cornell Univ, 02–04; mycological investigation, Storrs, Conn, 04–13; N. Y. BOT. GARDEN, 10,11. Asst, Lake Forest, 96–97; instr. biol. and bot, and asst. prof. bot, Univ. Mo, 97–02; asst. mycol, Cornell Univ, 02 04; mycologist in cheese investigation, U. S. Dept. Agric, 04–13; *mycologist in charge of microbiol. lab, Bur. Chem, 14–*. Fellow A. A. A. S; Bacteriol.

Soc; Am. Phytopath. Soc; Bot. Soc. Am; Dairy Sci. Assoc. Pathology; mycology; taxonomic and physiological studies in *Penicillium* and *Aspergillus*, organic agents in cheese ripening; food spoilage; microbiology of foods and feeding-stuffs.

Thomas, Mrs. H. Mark (See Chedsey, Mary Coe).

Topp, Emily Philippina, 122 Manhattan Ave, N. Y. City. N. Y. City, Dec. 14, 88. A.B, Hunter Coll, 09; Woods Hole, summer, 10; Columbia Univ, 09; M.A, 12; N. Y. BOT. GARDEN, 11, 12. Lab. asst, Hunter Coll, 09–11; *asst. biol, Julia Richman H. S, 13–*. Variegation in *Miscanthus*.

Torrey, John Cutler, Cornell Univ. Medical Coll, N. Y. City. Burlington, Vt, April 19, 76. A.B, Vt. Univ, 98; N. Y. BOT. GARDEN, 99–00; Ph.D, Columbia Univ, 02; fellow exp. path, Cornell Med. Coll, 04. Asst. zool, Columbia Univ, 00–01; bacteriologist, Sea Side Hosp, Staten I, N. Y, 03–04; asst. instr, histol. and bact, *Cornell Univ. Med. Coll*, 03–04; asst. prof. exp. path. and lecturer hygiene, 10–15; *prof. hygiene, 16–*. Soc. Exp. Biol. and Med; Am. Assoc. of Path. and Bact; A. A. A. S; Soc. Am. Bact; Soc. Serology and Hemotology; Harvey Soc. Hygiene; bacteriology.

Twiss, Wilfred Charles, Univ. of Utah, Salt Lake City. San Jose, Cal, July 9, 68. Univ. Cal, 89–95; B.A, 95; 09–11; M.A, 10; Columbia Univ, 17 18; Ph.D, 18; N. Y. BOT. GARDEN, 17–18. *Assoc. prof. bot, Univ. Utah, 11–*. A. A. A. S; Torrey Bot. Club; Sigma Xi. Pathology.

Uhlig, William Cullen, present address not known. New York, Dec. 22, 70. Ph.B, Columbia Univ, 96; Ph.D, 04; N. Y. BOT. GARDEN, 02 03. Asst. analyt. chemist, Columbia Univ, 99. Soc. Chem. Industry; Nat. Geog. Soc. Sanitation; water supply.

Umaceny, Lillian A. (Mrs. Lillian A. Tenopyr), 2915 Glenwood Rd, Brooklyn, N. Y. N. Y. City, Nov. 30, 86. A.B, Hunter Coll, 07; Columbia Univ, 07–15; A.M, 14; N. Y. BOT. GARDEN, 13. Teacher, N. Y. City pub. schools, 07–15. Relation of shape of cells to the shape of the organ.

Valentine, Morris Crawford, 5 Maxwell Ave, Jamaica, N. Y. N. Y. City, April 18, 76. A.B, Coll. City N. Y, 96; Coll.

Phys. and Surg, Columbia Univ, 96–98; Path. Inst, State Hospitals for Insane, 98–01; N. Y. Bot. Garden, 04. Teacher chem, Harlem Evening H. S. for Men, N. Y. City, 00–04; asst. teacher biol, DeWitt Clinton H. S, 01–04; Wadleigh H. S, 04–08; *first asst. biol (head of dept.), Richmond Hill H. S, 08–.* A. A. A. S. Teaching of biology.

Wang, Chung Yu, present address not known. Univ. Tientsin, China, 99; A.M, Columbia Univ, 04; N. Y. Bot. Garden, 04–05. Paleobotany.

Watterson, Ada (Mrs. Robert M. Yerkes), Univ. of Minnesota, Minneapolis, Minn. Cleveland, Ohio. A.B, Barnard Coll, Columbia Univ, 98; A.M, 00; N. Y. Bot. Garden, 99–00; Cold Spring Harbor, 99, 01; Woods Hole, 00, 06; Harvard Univ, summer, 06. Asst. bot, Barnard Coll, Columbia Univ, 99–02; asst. bot. and zool, 01–02; tutor biol, Teachers Coll, Columbia Univ, 02–05; instr. nat. study, Columbia Univ, summer, 04, 05. Barnard Bot. Club. Plant and animal physiology.

Whipple, Dorris William, present address not known. Pharm.G, N. Y. Coll. Pharmacy, 01; N. Y. Bot. Garden, 02. Bacteriology.

White, Violette S. (Mrs. John Ross Delafield), 17 E. 79 St, N. Y. City. N. Y. Bot. Garden, 01 02. Fellow, Wild Flower Pres. Soc. Am; Torrey Bot. Club; N. Y. Bot. Garden (life member). Taxonomy.

Wilcox, Edwin Mead, Univ. of Nebraska, Lincoln, Neb. Busti, N. Y, May 21, 76. B.S, Ohio State Univ, 96; A.M, Harvard Univ, 98; Ph.D, 99; fellow, 99–00; N. Y. Bot. Garden, 04. Asst. bot, Ohio State Univ, 94–97; prof. bot. and entom, Okla. Agric. and Mechan. Coll, 00–01; biol. and hort, Ala. Polytech. Inst, 01–04; prof. bot, and plant physiologist and pathologist, Ala. Exp. Station, 04–08; *prof. plant path, Univ. Neb, 08–.* Fellow A. A. A. S; Am. Soc. Nat; Bot. Soc. Am; Am. Phytopath. Soc. Physiology; pathology.

Wilkins, Lewanna, Eastern High School, Washington, D. C. Fairfax Co, Virginia, Jan. 21, 69. B.S, Wellesley, 91; Martha's Vineyard, summer, 92, 94; Woods Hole, 96; C. Hart Merriam's

Camp, Mt. Shasta, Calif, summer, 98; Goettingen, Germany, 05; Columbia Univ, summer, 07; N. Y. Bot. Garden, 07, 08, 09, 10, 11. *Teacher biol, Eastern H. S, Washington, D. C, 92–.* Wild Flower Pres. Soc. Am. (charter mem.); Biol, Soc, Washington, D. C; Nat. Geog. Soc; A. A. A. S. Taxonomy of *Solanaceae.*

Wilson, Guy West, Univ. of Kansas, Lawrence, Kan. Carmel, Ind, June 19, 77. B.S, DePauw Univ, 02; A.M, 03; M.S, Purdue Univ, 06; N. Y. Bot. Garden, 06–07; research scholar, 12, 13. Prof. biol, and curator mus, Mount Union Coll, Alliance, O, 03–04; instr. bot, Lafayette, H. S, Ind, 04–05; aid, N. Y. Bot. Garden, 06–07; prof. biol, and curator mus, Upper Iowa Univ, Fayette, Iowa, 07–10; asst. veg. path, N. C. Agric. Exp. Sta, 10–12; extension work in bot, Columbia Univ, 12–13; special agent, Bur. Pl. Ind, 13–14; State Univ. Iowa, 14–16; field asst, Bur. Pl. Ind, 17; *secy, Kansas Acad. Sci, 18–.* Ind. Acad. Sci; fellow Iowa Acad. Sci; fellow A. A. A. S; Am. Phytopath. Soc. Local flora of Indiana; mycology.

Wold, Emma Marie, State Univ, Eugene, Oregon. Trondhjem, Norway, Sept. 29, 73. A.B, Univ. Ore, 94; A.M, 97; Univ. Calif, summer, 03; Columbia Univ. and N. Y. Bot. Garden, 04–05; Univ. Ore, 07–08. Instr. sci, H. S, Eugene, Oregon, 99–04; instr. biol, Mills Coll, Calif, 05–07; instr. bot, Univ. Ore, 09–10. Algae.

Womack, Mary Douglas, 511 W. 112 St, N. Y. City. Farmville, Va, Jan. 17, 73. Univ. Chicago, summers 98, 00. B.S, Adelphi Coll, Brooklyn, 99; Barnard Coll, Columbia Univ, and N. Y. Bot. Garden, 11; M.A, Columbia Univ, 12. Teacher biol, H. S, New Haven, Conn, 99–01; *asst. teacher biol, Wadlegh H. S, N. Y. City, 01–.* N. Y. City Biol. Assoc; Barnard Bot. Club. Practical plant pathology; bacteriology and agricultural application; community gardening.

Wood, George Clayton, 798 Lincoln Place, Brooklyn, N. Y. Mexico, N. Y, Feb. 2, 78. A.B, Syracuse Univ, 00; Columbia Univ. and N. Y. Bot. Garden, 04–05; N. Y. Univ, 08–18; Ph.D, 18. Teacher hist, Syracuse Class. Prep. School, 99–00;

prin, Jefferson Gram. School, Little Falls, N. Y, 00–02; teacher biol, H. S, Port Richmond, N. Y, 02–03; asst. teacher biol, Boys' H. S, Brooklyn, N. Y, 03–14; publisher, H. S. Biol. Leaflet, Brooklyn, N. Y, 06–08; lecturer, Brooklyn Inst. Arts and Sci, 17 18; *head, dept. biol, Commercial H. S, Brooklyn, N. Y, 14–*. Am. Acad. Soc. and Polit. Sci; Brooklyn Inst. Arts and Sci; N. Y. Assoc. Biol. Teachers (v. pres.), 16–18. Plant distribution and ecology; lichenology.

Worthley, Irving Tupper, present address not known. Cornell Univ. Forest School, 00 02; N. Y. Bot. Garden, 03. Native and cultivated shrubs.

Yamanouchi, Shigeo, 27 Otsuka Nakamachi, Koishakawa-Ku, Tokyo, Japan. Tokyo, Japan, Sept. 7. 76. M.S, Teachers Coll, Tokyo, 98; Columbia Univ. and N. Y. Bot. Garden, 04–05; Chicago Univ. (including Woods Hole Marine Biol. Lab.), 05–07; Ph.D, 07. Asst. prof, Tokyo Teachers Coll, 04; asst. bot, Chicago Univ, 07–?, Fellow A. A. A. S. Cytology.

Yampolsky, Cecil, Agricultural College, Fargo, N. D. Kiev, Russia, April 21, 86. B.S, Univ. Wis, 13; Columbia Univ. and N. Y. Bot. Garden, 14–17. Asst. bot, Columbia Univ, 14–17; asst. prof. biol, Toledo Univ, 17–18; *asst. botanist, N. Dak. Exp. Station, 18–*. Cytology.

Yatsu, Naohidé, Zoological Inst, Koishakawa-Ku, Tokyo, Japan. Tokyo, Japan, Sept. 8, 77. A.B, Imper. Univ, Tokyo, 00; Ph.D, Columbia Univ, 05; Sc.D, 11; N. Y. Bot. Garden, 03–05. *Asst. prof. zool, Imperial Univ, Tokyo, Japan, 10–*. Zoology; cytology; embryology.

Yerkes, Mrs. Robert M. (See Watterson, Ada).

York, Harlan Harvey, Brown Univ, Providence, R. I. Plainfield, Ind, Sept. 9, 75. B.S, DePauw Univ, 03; A.M, Ohio State Univ, 05; student asst. chem, DePauw Univ, 01–02; tutor human anat. and physiol, 01–02; student asst. bot, 02–03; fellow bot, Ohio State Univ, 03–04; asst. bot, 04–05; fellow, Columbia Univ. and N. Y. Bot. Garden, 05–06; Univ. fellow, Johns Hopkins Univ, 10–11; Ph.D, 11. Spec. asst. bot, U. S. Nat. Mus, Wash, 06; assoc. in bot, Biol. Lab, Cold Spring Harbor, 06–10; instr. in charge of cryptogamic bot,

11–15; elected spec. asst. dendrology, Am. Mus. Nat. Hist, 06; instr. bot, Texas Univ, 06–09; asst. bot, Johns Hopkins Univ, 09–10; *asst. prof. bot, and head of dept, Brown Univ, 11–; field asst. white pine blister rust eradication, U. S. Dept. Agric, 16–.* Ohio Acad. Sci; fellow A. A. A. S; Am. Phytopath. Soc; Bot. Soc. Am; N. Eng. Bot. Club. Morphology; physiology; plant pathology.

Zeleny, Charles, Univ. of Ill, Urbana, Ill. Hutchinson, Minn, Sept. 17, 78. B.S, Univ. Minn, 98; M. S, 01; Ph.D, Chicago Univ, 04; N. Y. Bot. Garden, 01–02. Instr. zool, Univ. Ind, 04–07; assoc. prof, 07–09; assoc. prof, *Univ. Ill,* 09 15; *prof. 15–.* Fellow A. A. A. S; Soc. Zool; Am. Soc. Nat. Zoology.

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Vol. XIX November, 1918 No. 227

JOURNAL

OF

The New York Botanical Garden

EDITOR

FRANCIS W. PENNELL

Associate Curator

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ARTHUR J. CORBETT, *Superintendent of Buildings and Grounds*
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Hammock on southern shore of Lake Okeechobee: Trees covering large areas are exclusively of the pond-apple, *Annona glabra*. Occasionally other broad-leaved trees and the bald-cypress, *Taxodium distichum*, are present. The pond-apple is amphibious, bears an abundant supply of fruits for the native animals and harbors epiphytic orchids and ferns. Note the buttressed trunks, the fascicled branches, and particularly the root-system which is here exposed as a result of the shrinking of the humus consequent upon the [illegible] drainage of the lake.

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BOTANICAL EXPLORATION IN FLORIDA IN 1917

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: With your permission I devoted four weeks during April and May, nineteen hundred and seventeen, to further exploration of southern Florida.

The whole or a part of each day was spent in the field. Our work was prosecuted not only by day, but often also by night. As a result a great deal of territory, chiefly in the botanically unknown and hitherto inaccessible parts of the lower portions of the peninsula, was investigated at least in a preliminary way. Through the interest and generosity of Mr. Charles Deering, both land and water were traversed in extent limited only by the amount of time at my disposal. I was accompanied by Mrs. Small who took care of the herbarium specimens. With the permission of Dr. David Fairchild, we made our headquarters at the laboratory building of the Plant Introduction Garden at Miami, and there had the coöperation of Mr. Edward Simmonds, in charge.

Our field-work was inaugurated by an examination of the Everglade prairie east of Homestead and Florida City, a peculiar region lying between the rocky pineland of the Everglade Keys and Bay Biscayne. This prairie is built up of a sticky marl on a rock foundation, and is elevated only a few feet above sea-level. It is almost level, usually dry, or nearly dry, during the winter, and normally submerged during the summer. The region is dotted with hundreds of hammock-islands, each comprising an area varying from several square rods to several acres.

The hammocks consist largely of several kinds of broad-leaved trees characteristic of low situations, such as the cocoa-plum (*Chrysobalanus*), swamp-bay (*Tamala*), bustic (*Dipholis*), wax-myrtle (*Cerothamnus*), myrsine (*Rapanea*), and red-mangrove (*Rhizophora*), and usually some saw-palmetto (*Serenoa*) and cabbage-trees (*Sabal*). Occasionally one or two pine trees tower above the other vegetation even in hammocks at a distance of several miles from the pine-woods, having sprung up evidently from seeds blown hither by westerly storms. Here and there one meets with hammocks made up almost entirely of a dense growth of the saw-palmetto and the cabbage-tree.

The prairies were rather barren, but in many places the saw-grass (*Mariscus*) was coming into flower and the occasional lower parts were bright with the flowers of two marsh plants, the marsh-pink (*Sabbatia*) and the grass-pink (*Limodorum*). Among other rare plants, we were surprised to find a marsh-fleabane (*Pluchea odorata*), previously known in our range only from Key West and Upper Matecumbe Key. But most surprising was the discovery of the West Indian Trema (*Trema Lamarckiana*). This shrub or tree was first found on this side of the Gulf Stream by the writer about six years ago on Boca Chica Key and on Big Pine Key. Several years later it came to our notice on Key Largo. However, the growth of it on the above-mentioned keys is insignificant compared with that on the prairies under consideration, where it often covers acres of lowlands.

This prairie is said to be exceptionally free from frosts during cold waves. On this account, it has been selected for the growing of tender vegetables. Large areas that were formerly unfit for cultivation even in the dry season have been reclaimed by ditching and by dredging navigable canals which serve as highways as well as for drainage, extending from the bay to the pinelands. Conspicuous changes in the natural vegetation have taken place as crop-raising has advanced. In addition to the native vegetation that covered the prairie, we now meet with exotic plants characteristic of more northern regions, such as the red-clover (*Trifolium pratense*), nonesuch (*Medicago lupulina*), alfalfa (*Medicago sativa*), and sweet-clover (*Melilotus alba*),

Fig. 6a. *Ficus aurea*, near the southern shore of Lake Okeechobee: In that region [illegible] on the right; the fig is the sprawling tree with [illegible] The most interesting

all of which have been introduced and become naturalized through the cultivation of vegetables.

The next day was devoted to Royal Palm Hammock. In contrast to the former methods of penetrating the jungle, we had the advantage of the several miles of trails recently opened by the custodian of the park.* Many interesting phenomena were observed, and the sight of the numerous young royal-palms (*Roystonea*) that are springing up in the jungle, to replace the older ones which are gradually dying, is encouraging as it assures the maintenance of the most characteristic element in the vegetation of the island.

A half dozen gigantic live-oaks were aërial gardens, heavily laden with various orchids and bromeliads, and particularly beautiful were the immense streamers of the Florida-moss (*Dendropogon*) which in many cases were not less than twenty-five feet in length. One of the live-oaks leans at an angle of about forty-five degrees, and contrary to the usual development of the crown where a trunk is not erect, nearly or quite all of the branches are on the leaning side. How the tree, with its roots spread out on the rock floor of the hammock beneath about a foot of soft light humus, maintains its semi-erect position seems inexplicable. The custodian pointed out numerous young royal-palms ranging all the way from a year or two old to trees nearly ready to push their leafy crown above the tops of the broad-leaved trees. There are several once tall living palms prostrate on the hammock floor. Having been blown over, these plants retained a sufficient part of the root-system on one side to supply the trunk and crown with nourishment and thus maintain life for a while; later the readjusted root-system gave enough nourishment to continue the growth at the gradually curving upward and finally erect apex.

On another day an attempt to reach Roberts Island† in the Everglades, for the purpose of some observations and collections, was defeated by a rise of the waters in the surrounding prairies.

* For detailed information concerning Royal Palm Hammock, see Journal of The New York Botanical Garden 17: 165–172. 1916 and 18: 98–111. 1917.

† For an account of a former exploration of this hammock, see Journal of The New York Botanical Garden 18: 98–111. 1917.

As an alternative we went southward to the edge of the Everglades and gathered several hundred living plants of a large rose-mallow (*Hibiscus*), half of which number we shipped to the Garden for the experimental work being carried on there in connection with that genus.

The beautiful tree of *Misanteca* in Brickell Hammock, well known to nearly all botanists visiting at Miami during the past decade, has been destroyed. It was blasted out of the rock in making a roadway, and the trunk was thrown along the side of the road to rot. This particular tree was for a long time thought by some botanists to be the sole representative of the genus *Misanteca* this side of Cuba. However, a search for additional specimens was rewarded by the discovery of many small trees and numerous seedlings. Some of them were transplanted to reservations where they will be protected and will probably be growing and perpetuating themselves after the other trees in Brickell Hammock have been exterminated,* and the hammock itself completely destroyed. During the search for *Misanteca* fine specimens of the bitter-bush (*Picramnia pentandra*) were discovered. Brickell Hammock is the only known locality for this West Indian plant on the Florida mainland. It is common in some parts of the forest, especially toward the bay; but it usually occurs as a shrub or a small tree. However, in some of the more open parts it grows more luxuriantly, and develops into a tree with a trunk eight to ten inches in diameter. This tree will soon disappear from the flora of the Florida mainland, except the specimens that have been removed to reservations, and their progeny.

On April 28, Dr. F. W. Pennell arrived at Miami after a collecting trip through Georgia and northern Florida. He was associated with me in exploration for three days in the Miami region and for three days on the Florida Keys, whence he had planned to sail for exploration in Colombia.

* Since writing the above many large trees of *Misanteca* have been discovered in Brickell Hammock by Mr. Victor Soar. It is likely that these are the trees from which the writer collected specimens in 1904, then adding the tree to the flora of the United States.

The last day of April was spent on Long Key in the Everglades. Fires had recently swept over the prairie between Royal Palm Hammock and Long Key and also through much of the pine-lands and parts of the hammocks of Long Key. The myriads of seedling pine trees so conspicuous the previous fall on the prairies and pinelands were nearly all destroyed. The forest fires were evidently more severe than usual, apparently on account of the increased supply of tinder and fuel resulting from the freezing spell of weather of the earlier part of the year. We went as far as Long Key Hammock which had been less damaged by the cold weather of the preceding February than the surrounding pine-woods. Ferns and orchids were well represented. A few specimens of our raresr maidenhair (*Adiantum melanoleucum*) were discovered in several lime-sinks. The Long Key hammock represents the only known locality for this fern. A very limited supply of the holly-fern (*Stenochlaena Kunzeana*) was found; but large quantities of the small halberd-fern (*Tectaria minima*) were met with. The specimens collected exhibited all forms from those with simple nearly entire leaf-blades to those with divided or compound blades. Orchids rare in Florida were represented by species of the genera *Oncidium*, *Macradenia* and *Brassia*. A half-dozen other epiphytic orchids occurred plentifully in this hammock.

Sunrise on May the first found us on Big Pine Key. On taking the field we found a great part of the pinelands fire-swept. Although the fire had burned off the vegetation only a few weeks previous, many plants had sent up new growth, and some were in full flower. The little star-grass (*Hypoxis juncea*) is perhaps the first plant to recover and flower after a fire. The nourishment stored in its deeply buried corm makes the plant, except the tips of the leaves, fire-proof. Its bright yellow star-shaped flowers were conspicuous against the dark burned surface of the ground. Two colors predominated among the flowers then in bloom, yellow and pink. The former was represented mainly by the flowers of two kinds of sensitive-pea (*Chamaecrista*), a yellow–flax (*Cathartolinum*), a rattle-box (*Crotalaria*), a species of *Dolicholus*, and one of *Caesalpinia*. Pink was represented by

species of *Bletia*, *Sabbatia*, *Agalinis*, and *Ruellia*. Shrubs and trees of the locust-berry (*Byrsonima lucida*) were just putting forth their showy racemes. When in full flower this is one of the most beautiful trees in the whole flora of North America.

Three kinds of herbaceous vines, two milkweeds, and a tropical hemp-weed, had sprung up in abundance after the fire and were in full bloom. We found this profusion of flowers in spite of a prolonged drought.

On Key West, however, the effects of the drought were more pronounced. Although the shrubs and trees in the hammocks were not seriously damaged, and were even coming into flower, the herbaceous plants were killed or partly dried up. We secured some specimens of the rare cactus, *Cephalocereus keyensis*, for growing in the conservatories of the Garden, and collected specimens of a genus new to the flora of the United States, a true *Euphorbia*. This cactus-like plant (*Euphorbia lactea*) is a native of the East Indies. It has been naturalized in the West Indies for many years; but has only recently been introduced into our flora.

Leaving Dr. Pennell on Key West, I returned to Miami and on the following day set out on a collecting trip to Lake Okeechobee. Our boat was the "Barbee." She left Buena Vista in the forenoon, manned by Paul Matthaus, captain, Charles T. Simpson, conchologist, Victor Soar, horticulturist, Leban Bethal, cook and crew, and the writer. The several objects of the cruise were to secure collections of herbarium specimens, various living plants for cultivating, and collections of shells, both living and fossil, as well as to make a general survey of hitherto inaccessible territory.

We went to the lake by way of Fort Lauderdale and the North New River canal, because the Miami canal was as yet imperfectly dredged. While in New River Sound our progress was temporarily interrupted by a severe electric storm; indeed it might have been seriously interfered with, as a bolt of lightning struck uncomfortably close to the "Barbee." On entering Lake Mabel, after the storm had spent itself, we noticed a house-boat that had been blown ashore and an accompanying motor-boat

In the heart of the "Big Cypress". Prairie in the foreground. Cypress-head in the background. Prairie similar to that shown above, except for variety in herbaceous plant-associations, often stretches as far as the eye can see, other times less extensive and interrupted by cypress-strands, cypress-heads and hammocks. The cypress heads, comprising mostly the pond-cypress, *Taxodium ascendens*, are either open, as in the above view, or so dense that one can scarcely see beyond the outer edge. Note the epiphytes,

seeking help. The motor-boat had been towing the house-boat and both were bound for Lake Okeechobee. Learning that a sudden squall during the storm had swept their gasoline and other supplies from the decks, we took the motor-boat in tow as far as Fort Lauderdale, where the occupants could replenish their stores.

The North New River canal also was not perfectly dredged, and the low stage of the water in the Everglades enabled us to locate quite readily the sections of the canal that needed deepening. Even after we were in the lake we had considerable difficulty in crossing the southern part in order to reach a new colony at the mouth of Three-mile Canal called Moorehaven. We selected this place as the center from which to explore the surrounding country, and spent several days in the region.

Superficially the borders of Lake Okeechobee are built up of a mass of decayed vegetable matter. Naturally a dense, almost impenetrable, pond-apple hammock clothes the formation around the southern half of the lake. This hammock gradually tapers off into the prairies of the Everglades. A canal cut directly through this deposit of humus connecting Lake Okeechobee with Lake Hicpochee, one of the sources of the Caloosahatchee River, offered an excellent chance to study the plants of the region lying between the two lakes. We went as far as the middle of Lake Hicpochee, but could not get into the Caloosahatchee River on account of the low stage of the water. The rich wet humus in and about Lake Hicpochee supports a wonderful growth of the aquatic plants of the region, while the higher land was covered wth masses of two kinds of half-shrubby mallows (*Hibiscus* and *Kosteletzkya*) and two kinds of evening-primroses (*Jussiaea*). Among these were scattered various asters, fleabanes (*Erigeron*), and beggar's-ticks (*Bidens*), while herbaceous vines sprawled over the ground or clambered over the other vegetation nearly everywhere.

A day was spent collecting through a strip of land for a distance of twelve to fifteen miles southeast of Moorehaven. Two or three years ago this region was an impenetrable jungle, partly dry and partly wet. Today it is drained and largely cleared of

the primeval hammock, and the trail running through it is flanked by cultivated fields, planted in various truck-crops, and hundreds of acres in extent. The original hammock was mostly made up of pond-apple (*Annona*), and all except the higher parts were swampy. Here and there, as is shown by the remains of the jungle, were colonies of ash (*Fraxinus*), live-oak (*Quercus*), and swamp-maple (*Acer*), and isolated trees of cypress (*Taxodium*). In the more open parts the southern elder (*Sambucus*) grows in masses with the plants set so thickly that all other vegetation is excluded. This shrub bears flowers and large clusters of purple-black fruits all the year round.

Several conspicuous vines grow throughout the jungle. The two with more showy flowers are the Carolina-aster (*Aster carolinianus*) and a tropical hemp-weed (*Mikania cordifolia*). These vines often occur together, sometimes intimately intertwined. The flowers of the hemp-weed are violet-scented and their fragrance fills the air for long distances. An interesting vine apparently confined to the Okeechobee region is a gourd. Whether this is a native plant or one introduced by the Indians many years ago, we have not yet been able to learn. It is a high-climber, has large yellow flowers and produces great quantities of globose fruits about the size of a baseball. The fruits are usually mottled with green and white, and hang in large numbers from the trees on which the vine climbs.

Soil and rock are not in evidence in this strange land. Several feet of decayed vegetable matter completely covers a substratum of sand. In this "peat," not only do the native plants thrive, but cultivated crops may be grown without the aid of fertilizer; while weeds, and escapes from forage-crops and flower-gardens grow with exceptional luxuriance.

We next transferred our activities to the eastern side of Lake Okeechobee and landed about the middle of the eastern shore. The beach and the hammock behind it furnished extensive collecting grounds. This hammock abounds in interesting plants and plant associations. It is a mingling place for tropical and temperate vegetation. Typically tropical ferns and orchids and various shrubs and trees grow intimately intermixed with spe-

cies or genera typical of more northern regions. Owing to the warm and moist atmosphere, as a result of the prevailing westerly winds over the broad expanse of Okeechobee, the plant covering in addition to the shrubs and trees is copious and varied, and epiphytic vegetation is much in evidence.

Thence we went down the West Palm Beach Canal to within a few miles of Palm Beach, passing through the Everglades, pinelands, and cypress lands, and returned by the same course, to the Lake whence we proceeded back to Buena Vista and Miami by way of Fort Lauderdale.*

No sooner had I returned from Lake Okeechobee than circumstances determined that I start out on an expedition to the Big Cypress Swamp. This little-known geographic designation still conveys a more vague idea to the average inhabitant of the United States than ever did the words Everglades or Okeechobee. Mr. W. Stanley Hanson, Bird Inspector for Florida, and one of the few men acquainted with the Big Cypress, was about to return to Fort Myers across country. The temptation to accompany him was too strong to be resisted, and we set out on what proved to be the most interesting and exciting collecting trip by land in which I have ever participated.† We made the trip in two "Fords."

Altogether there were five in our party. In addition to Mr. Hanson and the writer, there were Mr. Gordon Olmstead who drove one car and Mr. John DeWinkeler who drove the other. At Fort Myers we were joined by Mr. A. H. Gillingham who accompanied us to the Big Cypress.

Our objective lay only about sixty miles northwestward of Miami across the Everglades. In order to reach it we had to travel more than two hundred and fifty miles over various kinds of roads and trails. Our course lay along the three sides of an equilateral triangle which includes almost wholly uninhabited, and to a great extent unknown, territory. From Miami, we went

* A full "Narrative of a Cruise to Lake Okeechobee," as outlined above, will appear in a paper in the American Museum Journal.

† A detailed account of "A Botanical Excursion to The Big Cypress" will appear in a separate paper.

north to Fort Pierce, and thence southwest across the northern Okeechobee region and the Indian Prairie to the Caloosahatchee River and along the southern bank of that river to Fort Myers. From Fort Myers we struck into the wilderness of the Big Cypress where we spent three days exploring its botanical riches and other natural features, particularly the Okaloacoochee Slough and Rocky Lake. The region lies south of the Caloosahatchee river between the Everglades and the Gulf of Mexico. It is little known and almost uninhabited, except by Seminole Indians. A large part of the Big Cypress is prairie, swamp, and marsh. The prairies are often interrupted with hammocks, cypress-heads, cypress-strands, and lakes. The northern edge has considerable areas of pineland.

We went direct to the Okaloacoochee Slough and then to the region of the one time Fort Shackleford which is near the western edge of the Everglades only about sixty miles northwest of Miami.

Spring had come and the prairies were natural flower gardens. Bright colors, principally yellow and pink, represented large patches of different plants often acres in extent; sabbatias, gerardias, bladderworts, heliotropes, polygalas, and orchids usually predominated. A white star-like spider lily was scattered almost everywhere.

While in the Okaloacoochee Slough we visited a great rookery inhabited by thousands of birds, representing mostly different kinds of ibis. The predominating tree in the slough is the river-cypress (*Taxodium distichum*), and very large trees were often literally covered with the birds. This tree perhaps constitutes most of the cypress-strands. It is also the cypress of the eastern shore of Lake Okeechobee and the hammocks of the two localities resemble each other closely. There are many kinds both among the woody and the herbaceous plants that are common to both hammocks.

South of the Okaloacoochee Slough we found numerous palmetto hammocks and hard-wood hammocks where deer, bear, and wild-turkeys were plentiful. The cypress-heads of that region are made up of almost a pure growth of the pond-cypress

In the Okaloacoochee Slough: Shallow water covered with an unbroken carpet of young plants of water-hyacinth, *Piaropus crassipes*, and water-lettuce, *Pistia Stratiotes*, in foreground. Edge of cypress strand in background. Back of the cypress-trees, *Taxodium distichum*, is a hammock of various broad-leaved trees and shrubs and a copious growth of ferns and herbaceous flowering plants. The Okaloacoochee Slough comprises the largest ibis rookery in the United States. Large birds, representing several species of ibis, may be seen occupying all of the cypress trees. They are particularly prominent on the dead tree near the center of the

(*Taxodium ascendens*). In some places the cypress trees are so close together that one cannot see beyond the edge of the stand; at other places the trees are widely separated and are so evenly spaced as to give the impression of having been set out at definite distances from each other.

Between the Okaloacoochee Slough and Fort Shakleford is Rocky Lake. The waters of this lake are contained in a rock basin several acres in extent, surrounded by a picturesque hammock. Here we noticed rock cropping out from beneath the sand. Naturally it was limestone and closely resembled that we observed several years ago when collecting further to the southwest beyond the source of the Chokoloskee River. We proceeded beyond Rocky Lake as far as a deserted Indian mission several miles south of Fort Shakleford and about four miles from the western edge of the Everglades. After leaving the lake the trail presents a continuous panorama or cyclorama of enchanting views. Although the country is as nearly flat as land can be and the woody vegetation consists only of cypress-heads, palmetto hammocks, and hardwood hammocks, every turn in the trail presents different and pleasing views. We spent sufficient time in the vicinity of the mission to collect all the plants then in flower or in fruit, and then retraced our course to the Okaloacoochee Slough. Thence we changed our course and called at the colony of Immokalee which is situated in the wilderness about thirty miles, in a direct line, southeast of Fort Myers. Returning to Fort Myers by the shortest trail, we set out over essentially the same course by which we had come, and returned to Miami.

The last day available for field-work was devoted to Lower Matecumbe Key. We were able to do this through the kindness of Mr. E. L. Kline, superintendent of the Florida East Coast Railway, who ordered the night train to be stopped on the key so we could get off and thus spend the following day collecting there. Our main object on Lower Matecumbe Key was to collect flowers of a new cactus, since described as *Cephalocereus Deeringii*.* We found both flowers and fruits, and also collected

* Journal of The New York Botanical Garden 18: 199–203. 1917.

plants which were brought north and are now growing in the conservatories of the Garden.

An opening in the hammock near the northern end of the island with a level plate-rock floor was a veritable flower garden. In the early morning all or nearly all the flowers were open. Although there was but little soil on the rock, it was almost completely covered with herbaceous vegetation. One of our very rare plants, a mallow (*Cienfuegosia heterophylla*), was there in abundance. It is known north of the Gulf Stream only on two other Florida Keys. Two kinds of *Portulaca*, one pink and one yellow, helped to carpet the rocks. A slender stemmed morning-glory (*Evolvulus*), with myriads of small pink flowers, formed mats six to eight feet in diameter. The tropical dew-flower (*Commelina elegans*) was in bloom. Its bright blue flowers were conspicuous nearly everywhere. The day following my return from Lower Matecumbe Key, we packed our specimens, comprising living plants for the conservatories and dried ones for the herbarium, and started north with the collection.

In addition to the exploration described on the preceding pages, ten days during December were devoted to making collections and studying in the field cacti, persimmons, palms and zamias in northern Florida and the peninsula. The regions then investigated were those about River Junction, Apalachicola, Tallahassee, Gainesville, Fort Pierce, Miami, and Royal Palm Hammock. A report describing this trip and giving in detail the results has already appeared in the April (1918) number of this JOURNAL.

Respectfully submitted,

JOHN K. SMALL.

THE DAHLIA BORDER

The new dahlia border, the planting of which was described in the JOURNAL for August, was favored by almost ideal weather conditions in September and October and offered a gorgeous display of form and color for a period of nearly three months, flourishing until seriously damaged by frost on the morning of November 6 and finally killed on the morning of November 7. On the morning of the 6th, the standard minimum thermometer located near the Propagating House, at a distance of about half a mile from the dahlia border and at an elevation thirty or forty feet higher, indicated a minimum of 30° F., while on the 7th, the minimum was 26°. On the morning of October 23, with an indicated minimum of 32.5° at the same place, a few of the shorter, more exposed plants were injured. Although the elevation of the border was nearly uniform throughout its length, the effects of the lighter frosts of October 23 and November 6 showed pockets or zones of damage due to slightly lower temperatures or to more direct exposure to the rays of the early morning sun. However, with due allowances for these differences of environment and for differences in the height of the plants, certain varieties showed greater resistance to frost than others did. Minnie (Mina) Burgle, which originated in the cool temperate climate of the San Francisco Bay region of California, was distinctly more hardy than its neighbors, while Attraction, Cambrian, Caradoc, Dr. Roy Appleton, Golden Gate, Pink Pearl, Mt. Shasta, Rev. Dr. Williamson, Thuringia, Vater Rhein, and W. J. Matheson seemed to show a slight superiority in the matter of resistance to injury by frost.

The planting was all done in the month of June, as the consignments of roots were received, ranging from the first week to the last week of the month. The various plantings finished the season in about equally good condition and from this experience alone one might be inclined to favor the earlier planting, as it resulted in a longer period of flowering. However, the writer is of the opinion that planting in the early part of May would have been attended with less favorable results. Water-pipes were

laid along the border and water was applied five or six times during the season. During the summer there were two periods of excessively high temperature which doubtless injured the plants, though less than might have been the case had there been no provision for watering. On July 22, the standard thermometer (Weather Bureau pattern) showed a shade maximum of 99° and on August 7, a maximum of 105°.

The first variety to bloom was Mrs. A. J. DuPont, which opened a flower on July 14, about four weeks after the root was planted, but this was the forced product of an unhealthy plant, which accomplished little more during the remainder of the season. Of the plants which flowered freely in July, a few, like J. H. Jackson and Mme. Louise Perrier, finished the season poorly, so far as blossoming was concerned, while others, like René Cayeux, Geneveva, and Richard Box, were continuous and persistent performers for a period of three months and a half, until cut down by frost. Doubtless the Countess of Lonsdale also, our only root of which failed to grow, would have been in this latter category. Most of the pompons and collarettes also were early and continuous bloomers. Of the nearly 500 individual plants and 295 varieties of dahlias that grew and survived the summer, nearly all reached the blossoming stage. With due allowances for the retarding effects of unfavorable development upon the time of flowering, certain varieties, such as Edith Carter, Vater Rhein, Brisbane, Decision, and Rev. Dr. Williamson, gave the impression of being consistently late-bloomers.

As already acknowledged in the JOURNAL for August, the Garden is greatly indebted to the professional and amateur growers of dahlias whose generosity made this new border possible. The display attracted much attention from the public and it certainly did much to awaken general interest in the remarkable effectiveness of the modern dahlia as an ornamental plant.

MARSHALL A. HOWE

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Crataegus irrasa. BLANCHARD'S THORN.
Location: Fruticetum.
Natural distribution: Vermont, New York and Quebec.

Crataegus Jesupi. JESUP'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Crataegus Laneyi. LANEY'S THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus laurentiana. FERNALD'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern North America.

Crataegus leiophylla. MAINE'S THORN.
Location: Fruticetum.
Natural distribution: New York and Pennsylvania.

Crataegnus lemingtonensis. LEMINGTON THORN.
Location: Fruticetum.
Natural distribution: Vermont and New Hamsphire.

Crataegus Lennoniana. LENNON'S THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus littoralis. SEASIDE THORN.
Location: Fruticetum.
Natural distribution: Connecticut.

Crataegus Macauleyae. MISS MACAULEY'S THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus macracantha var. rhombifolia. SMALL-FRUITED LONG-SPINED THORN.
Location: Fruticetum.
Natural distribution: Northeastern North America.

Crataegus macrosperma. VARIABLE THORN.
Location: Fruticetum.

Natural distribution: Northeastern United States and Nova Scotia.

Crateagus macrosperma var. **matura.** SHARP-LOBED VARIABLE THORN.

Location: Fruticetum.

Crataegus macrosperma var. **pastorum.** PASTURE VARIABLE THORN.

Location: Fruticetum.

Natural distribution: Western New England and New York.

Crataegus macrosperma var. **pentandra.** FIVE-STAMENED VARIABLE THORN.

Location: Fruticetum.

Natural distribution: Vermont to Virginia.

Crataegus Marshallii. PARSLEY HAW.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Crataegus missouriensis. MISSOURI THORN.

Location: Fruticetum.

Natural distribution: Missouri.

Crataegus mollis. DOWNY THORN.

Location: Arboretum.

Natural distribution: Northeastern North America.

Crataegus monogyna. HAW.

Location: Fruticetum. Arboretum.

Natural distribution: Europe and temperate Asia.

Crataegus monogyna var. **albo-plena.** WHITE DOUBLE-FLOWERED HAW.

Location: Arboretum.

Horticultural origin.

Crataegus monogyna var. **rubro-plena.** RED DOUBLE-FLOWERED HAW.

Location: Arboretum.

Horticultural origin.

Crataegus Oakesiana. OAKES' THORN.

Location: Fruticetum.

Natural distribution: Vermont.

Crataegus Paddockae. PADDOCK'S THORN.
Location: Fruticetum.
Natural distribution: Vermont.

Crataegus Painteriana. PAINTER'S THORN.
Location: Arboretum.
Natural distribution: Pennsylvania.

Crataegus pascens. DODGE'S THORN.
Location: Fruticetum.
Natural distribution: Michigan and Wisconsin.

Crataegus pequotorum. PEQUOT THORN.
Location: Fruticetum.
Natural distribution: Connecticut.

Crataegus persimilis. HYBRID THORN.
Location: Fruticetum.
Natural distribution: New York.

Crataegus phaenopyrum. WASHINGTON THORN.
Location: Fruticetum. Arboretum.
Natural distribution: Southeastern United States.

Crataegus Pringlei. PRINGLE'S THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Crataegus pruinosa. WAXY-FRUITED THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Crataegus punctata. DOTTED HAW.
Location: Fruticetum. Arboretum.
Natural distribution: Northeastern United States and Quebec.

Crataegus punctata var. **aurea.** YELLOW-FRUITED DOTTED HAW.
Location: Fruticetum.

Crataegus Reverchoni. REVERCHON'S THORN.
Location: Fruticetum.
Natural distribution: Missouri and Texas.

Crataegus rivularis. NARROW-LEAF HAW.
Location: Fruticetum.
Natural distribution: Great Basin Region.

Crataegus rudis. RED THORN.
Location: Fruticetum.
Natural distribution: Missouri.

Crataegus rugosa. FRETZ'S THORN.
Location: Fruticetum. Arboretum.
Natural distribution: Eastern United States.

Crataegus sanguinea var. **villosa.** WOOLY SIBERIAN THORN.
Location: Fruticetum.
Natural distribution: Russia.

Crataegus spathulata. SMALL-FRUITED HAW.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Crataegus straminea. ALLEGHANY THORN.
Location: Fruticetum.
Natural distribution: Eastern United States.

Crataegus succulenta. LONG-SPINED THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States and Nova Scotia.

Crataegus succulenta var. **occidentalis.** COLORADO THORN.
Location: Fruticetum.
Natural distribution: Western United States.

Crataegus umbratilis. UMBRELLA THORN.
Location: Fruticetum.
Natural distribution: Connecticut.

Crataegus uniflora. DWARF THORN.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Crataegus Vailiae. MISS VAIL'S THORN.
Location: Fruticetum.
Natural distribution: Virginia, North Carolina and Missouri.

Crataegus villipes. THIN-LEAVED THORN.
Location: Fruticetum.
Natural distribution: Northeastern United States and Quebec.

NOTES, NEWS AND COMMENT

Professor Henry Allan Gleason of the University of Michigan arrived at the Garden in the latter part of October, planning to spend two months in the study of North American Ironweeds, the genus *Vernonia* and near allies. Professor Gleason published some years ago a preliminary revision of *Vernonia* and he is now preparing the manuscript of the tribe *Vernonieae* for the North American Flora. The same part of the Flora will also contain the family *Ambrosiaceae*, the manuscript for which, excepting perhaps the genus *Xanthium*, will be furnished by Dr. P. A. Rydberg.

Professor Frederic S. Lee, of Columbia University, has been sent to England and France on a special mission by the United States Public Health Service.

A large collection of fungi was brought in on September 24, from Scarsdale, New York, by Mrs. I. Martin and Mrs. L. M. Keeler. It contained, among many interesting species, a specimen of *Grifola Sumstinei*. On September 25, Mrs. Keeler collected in the same locality a cluster of *Clitocybe subconnexa* and presented it to the Garden herbarium. This species was first collected in the New York Botanical Garden and had been known only from the original collection.

Dr. E. W. Olive, of the Brooklyn Botanic Garden, spent some time during the past summer assisting government and state agents in locating plant diseases and instructing farmers how to combat them. An account of his experiences in part of New York and Virginia were given in a public lecture at the New York Botanical Garden on October 26, and was accompanied by lantern slides illustrating some of the most important and recently introduced diseases. Among these were the nematode disease of wheat found in Virginia and the potato wart disease discovered in Pennsylvania.

Specimens collected in Colombia by Doctors Rusby and Pennell in 1917 and 1918* have served to render more complete the investigation by Dr. B. L. Robinson of the Eupatoriums of Colombia, a descriptive revision of which has recently been published by him.† Dr. Robinson's paper is the first contribution on the flora of northern South America to appear since the organization of the coöperative botanical study of that flora between the New York Botanical Garden, the Gray Herbarium of Harvard University, and the United States National Museum.‡

Dr. Robinson describes 93 species of *Eupatorium* inhabiting Colombia; three of those collected by Doctors Rusby and Pennell are species new to science; he also had the use of many other specimens from our herbarium previously collected in Colombia by Triana, Holton, Lehmann, and H. H. Smith. Dr. Pennell's collection was not completely sorted at the time Dr. Robinson's paper went to press, and additional Eupatoriums have been found in arranging it, among them two more undescribed species, which Dr. Robinson will doubtless refer to in a subsequent publication.

A joint meeting of the Corporation, the Managers, and the Women's Auxiliary was held at the Garden on the afternoon of Thursday, October 10. The new Dahlia Collection near the Botanical Garden railroad station, then in full bloom, was first visited, followed by an inspection of the library, laboratories, herbarium, and parts of the museums, with special reference to recent rearrangement and accession. The party then proceeded to Conservatory Range No. 2 to view the progress of construction of the Central Display Greenhouse and the Orchid Greenhouse given by Daniel Guggenheim and Murry Guggenheim, these structures being now about one half completed, much delayed by failure of the contractors to complete the work during the specified time. The new School Garden Shelter House given by Mrs. Frederick Ferris Thompson was next visited, followed by an inspection of the Rose Garden.

* Jour. N. Y. Bot. Gard. **19**: 117–138. 1918.
† Proc. Am. Acad. Arts & Sci. **54**: 264–330. 1918.
‡ Jour. N. Y. Bot. Gard. **19**: 182–185. 1918.

Special meetings of the Corporation and of the Board of Managers were held at the Mansion, and Mr. John L. Merrill was elected a manager to fill the unexpired term of the late James A. Scrymser, and Mr. Merrill was also elected Treasurer to succeed Mr. Scrymser.

On Thursday, October 17, at 3 P.M. at the Mansion, a lecture on "The use of Plants and Flowers in Design" was delivered by Miss Alice Donlevy. This was illustrated by engravings and colored drawings showing natural and conventional plant forms; textiles showing weaving and printing in color as practised in Colonial times with the use of dyes extracted from native plants; also laces, of home-raised, home-spun silk dating from the early days of America. Miss Donlevy emphasized the present need of originality and patriotism in the industrial arts and advocated a greater and better use of native plants, insisting that repetitions and variations of ancient designs, and drawings from casts, were not as valuable as studies made directly from nature.

Mrs. Britton assembled from the collections of the New York Botanical Garden a few of the familiar cultivated exotic plants, such as acanthus, bamboo, lotus, palms, papyrus, and the bay and laurel, used by the ancients for wreaths; she showed also the American laurel, which has been advocated as our national flower; also Indian and Kaffir corn, millet, hemp and various other plants, suitable for design. A collection of duplicate plates from Addisonia was also exhibited.

The meeting was attended by a large number of students and Art teachers. Professor Richard T. Bach, of the Metropolitan Museum of Art, and Dr. James P. Haney, of the Department of Education, very kindly addressed them and gave them practical advice and information.

The library has recently acquired the "Sertum Palmarum Brasiliensium" by J. Barbosa Rodrigues. This work, which is in two large portfolios, contains nearly one hundred and seventy-five colored folio plates of Brazilian palms with accompanying descriptions in Latin. It was published in Brussels in 1903 at the expense of the Brazilian government.

Five shipments of recent German periodicals have reached the library. This has been made possible through the efforts of the American Library Association which holds a license for such importations, while separate institutions do not. In the words of the secretary of the A. L. A., "The trail has led through the Department of State (with five changes of officials); British Embassy, British Foreign Office, Board of Trade, Stationery Office, Postal Censor, Library Association; the American War Trade Board and Censorship Board; the American Embassies in London and Paris, the Legations at The Hague and in Berne; the French Ministry of Foreign Affairs; numerous agents and over a hundred institutions."

The periodicals for 1916 and 1917, ordered as usual through our American agent, are still held abroad.

A splendid sugar maple standing near the Bedford Park Entrance to the Garden had one of its large branches torn away from the trunk several years ago by a storm, leaving an ugly wound. The entire side of the trunk below the wound is now covered with fruit-bodies of a bracket fungus, *Cerrena unicolor*, while another species, *Elfvingia megaloma*, appeared during the past summer at the base of the tree.

In the palm house of the New York Botanical Garden various species of West Indian mosses are growing, some on the earth under the palms and others on stems of tree-ferns which have been sent up from Jamaica and are temporarily housed there. One of the most interesting sorts, recently found in fine fruiting condition, is a small species of *Fissidens*, *F. Kegelianus* C.M.; this plant ranges naturally from Surinam, its first known country, northward through the West Indies to tropical Florida, where it has been collected by Dr. Small at Costello's Hammock and Madeira Bay.

On the stems of tree-ferns, *Cyathea elegans*, from Jamaica, sterile plants of *Hypopterygium Tamarisci* have been living for sixteen years and have gradually crept downward to the soil. Var-

ious species of local mosses may also be found there, such as, *Rhynchostegium serrulatum*, *Amblystegium* and a slender form of *Philonotis*, probably *P fontana*, which never fruits but propagates by axillary gemmae.

Meteorology for September.—The total precipitation for the month was 2.83 inches. The maximum temperatures recorded at the Garden for each week were 82° on the 3d, *83° on the 10th*, 81° on the 17th, and 75° on the 30th. The minimum temperatures were 54° on the 9th, 47° on the 11th, 42° on the 22d, and *41° on the 28th.*

Meteorology for October.—The total precipitation for the month was only 0.58 of an inch. Maximum temperatures recorded at the Garden for each week were *80° on the 6th*, 79.5° on the 11th, 74° on the 16th, and 74° on the 27th. Minimum temperatures for each week were 38° on the 4th, 35.5° on the 9th, 34° on the 19th and 20th, and *32.5° on the 23d.* Local frosts, injurious to tender plants, occurred on the 19th, 20th and 23d.

ACCESSIONS

MUSEUMS AND HERBARIUM

1,363 specimens of flowering and flowerless plants from the Canadian Rocky Mountains. (By exchange with the Academy of Natural Sciences of Philadelphia.)

4 specimens of *Xanthium globosum* from Kansas. (Given by Professor Charles A. Shull.)

1 specimen of *Cheilanthes Fêei* from California. (By exchange with the United States National Museum.)

50 photographs of cacti. (By exchange with the United States National Museum.)

14 photographs of type specimens of plants of the Philippines and adjacent islands. (By exchange with the Bureau of Science, Manila.)

1 specimen of *Phyllosticta congesta* from Georgia. (By exchange with the United States Department of Agriculture.)

1 specimen of *Campanula floridana* from Florida. (By exchange with Mr. Severin Rapp.)

205 specimens of flowering plants from Colorado. (By exchange with Mr. E. L. Johnston and Dr. George G. Hedgcock.)

3 specimens of hepaticae from Mexico. (By exchange with Professor A. W. Evans.)

17 specimens of flowering plants from Quebec. (By exchange with Harvard University.)

1,060 specimens of flowering plants from the Philippine Islands. (By exchange with the Bureau of Science, Manila.)

2 specimens, *Juniperus sibirica* and *Taxus canadensis*, from Lancaster County, Pennsylvania. (Given by Dr. H. Justin Roddy.)

3 specimens of hepaticae from Maine. (By exchange with Miss Annie Lorenz.)

15 specimens of flowering plants from Dade County, Florida. (Given by Dr. R. M. Harper.)

LIBRARY ACCESSIONS FROM JULY 1 TO OCTOBER 31, 1918

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JOURNAL

OF

The New York Botanical Garden

EDITOR

FRANCIS W. PENNELL

Associate Curator

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American truffles collected with the aid of a trained dog

JOURNAL

OF

The New York Botanical Garden

VOL. XIX December, 1918 No. 228

POSSIBILITIES OF THE TRUFFLE INDUSTRY IN AMERICA*

In these days when Americans are looking toward the expansion and development of home industries, it is quite fitting that the truffle problem should be brought to the attention of the public. While truffles are usually looked upon as a delicacy, and may be unknown to the average person in America, the collection and sale of these interesting edible fungi is an occupation of considerable importance in European countries. In France from $6,000,000 to $7,000,000 worth are sold annually at from $1 to $2 per pound. Fresh truffles shipped to New York often sell as high as $6 to $8 per pound.

The truffles are the most valuable of all the edible fungi and are at the same time the most difficult to collect, since they occur buried from two to eight inches in the ground. In Europe where these fungi are collected and sold as a commercial article, they are collected with the aid of trained animals such as pigs and dogs. These animals are able to detect the presence of the fungi by their odor, and are trained to hunt and dig them. Europeans coming here, who are familiar with the habits of these fungi in Europe and the means employed there to collect and put them on the market are naturally interested in finding them in this country in sufficient quantity to bring financial returns.

The recent importation of truffle-hunting dogs from Europe and their use in the vicinity of New York City has revealed the presence of several species of truffle, but in no case have they been found in sufficient quantity to be of practical value. The

* Published by courtesy of The New Country Life, May, 1917.

frequent collection of these plants, however, would suggest the possibility that they may be found in quantity if the search is persisted in long enough to discover those localities which have exactly suitable conditions for their growth.

The occurrence of truffles in close proximity to certain kinds of trees, especially oaks and willows, has given rise to the theory that they are in some way associated with the roots of these tree. This knowledge of their habitat is a valuable aid in locating them. Attempts to cultivate the plants artificially have been unsuccessful, so that, for the present at least, we must depend upon nature to furnish the supply, the only problem being to locate their natural haunts. Those who are familiar with these plants in Europe can see no reason why they should not occur in this country in the same abundance as in Europe.

The truffles are roundish, rather solid, and have very much the appearance of ordinary potatoes, their external surface being either smooth or rough according to the species. When cut through, the cut surface has a mottled appearance. The odor is characteristic and pleasant. They vary in size according to age, often reaching the size of a walnut or occasionally even larger.

The truffles belong to the genus *Tuber*. Three species have been reported in the eastern United States, in addition to the two recently collected, the exact identity of which is uncertain. While some of the species of *Tuber* collected in this country are similar to those usually eaten in Italy, we are not certain that those most commonly eaten have yet been discovered in America. Thirteen species have been collected in California, none of which have been found in sufficient quantity to be of economic importance.

Knowing that the truffle industry is one of considerable importance in the various countries of Europe, and knowing that the same or similar plants occur in this country, we have a reasonable right to hope that they will yet be found here in sufficient quantity to make America independent of the European supply.

The most favorable time for collecting truffles is in the autumn up to the time the ground freezes. When dogs are used, they are taken to the general locality which appears to be favorable

to the growth of these plants, and put on the scent. After scenting the ground for a time the animal stops to dig at frequent intervals until the plants are located. The animal is then taken away and the plants dug with an implement which is suited for shallow digging. Unless the dog is taken away he will eat the plants, since they are regarded as a great delicacy not only by man but by the lower animals as well. The dogs used for this purpose are especially trained and seem to take as much interest in locating these underground plants as does the average hunting dog in trailing wild game.

Pigs are often used for the same purpose in European countries, but though they are especially keen in locating the plants, they have the disadvantage of not being able to travel long distances and are not able to cover the ground as rapidly as dogs.

While truffles are no doubt often found by accident, unless one is familiar with them and has some knowledge of their uses as food, they would attract no attention and might even be overlooked entirely or mistaken for a ball of dirt. Any one suspecting the presence of these valuable plants should refer specimens to some scientific expert who will have no trouble in determining their identity, since they are easily recognized by their microscopic characters.

FRED J. SEAVER

NOTES ON AN EXPERIMENT WITH POTASH

Inquiry having made desirable first-hand information relative to the stimulative effect of potash on the growth of plants, independent of other elements, the experiment here described was carried out during the past summer and autumn.

Soil from the experimental garden was taken to a depth of seven inches, was well mixed on a clean cement floor and weighed quantities used. Six plots, each 3 by 2½ feet in area, with space one foot in width intervening were laid out by cross partitions in a side bench of a greenhouse. The soil placed in each weighed 126 lbs., and filled the bench to a depth of nearly seven inches.

The chemicals used were of high grade purity. The amounts applied to the various plots were as follows:

Plot 1. 7 grams* potassium sulphate
" 2. 14 " " "
" 3. control; no fertilizers added
" 4. 21 grams potassium sulphate
" 5. 28 " " "
" 6. 10½ " " "
10½ " sodium nitrate
10½ " calcium phosphate

To plots 1, 2, 4 and 5 potash only was added, and in those the amounts were in increased proportions so that the maximum in plot 5 was four times the quantity added to plot 1. Plot 3 was a "control" to which nothing was added. Plot 6 constituted what is known as a "complete fertilizer test" in which case nitrates and phosphates are also added.

The crop grown was bush beans of the well-known garden variety "1000 to 1." The seeds were selected for uniformity and medium size and were planted on July 11. When the first leaves above the cotyledons were well developed the number of plants was reduced to 30 for each plot and one week later the number was reduced to 25 per plot. Only vigorously growing and healthy plants were left to mature and these were well spaced in the plots.

By August 15, the plants were from 10 to 12 inches in height and were remarkably uniform in all plots in regard to height and amount of growth made. Plot 3 was slightly less green. At this date the lowermost leaves of at least some plants in each plot had turned yellow and fallen. Soon thereafter it was noticeable that the leaves were dying and falling most rapidly in plot 3. On September 4 the plants in this plot were very decidedly less leafy and green, while all other plots were leafy and of a healthy green color. All leaves were collected as they died either immediately after they fell or when ready to drop and they were dried and kept for final weighings.

The records for the various plots may be presented in tabular form as follows:

It will readily be seen that the best record was made by plot 2; of the plots to which potash alone was added it gave highest performance for every item. The control plot (no. 3) was lowest of all plots in every item. In the plot with complete fertilizer (no.

* 28 grams are equal to one ounce.

	Plots					
	1	2	4	5	6	3
Total no. of leaves	507	591	519	529	552	431
Total dry weight (excepting seeds) in grams	171	187	183	179	201	150
No. pods	106	138	119	133	167	87
No. seeds	247	335	263	301	297	141
Dry weight of seeds	69	105	89	90	84	44

6) the performance exceeded that of plot 2 for only total weight of plants (exclusive of seeds) and number of pods.

Perhaps the most significant result obtained in this experiment is the evidence that the immediate benefits of potash in such a crop as beans are not necessarily in proportion to the amounts used. There is an optimum amount which in this experiment was 14 grams (one half ounce) to 126 lbs. of soil.

A. B. Stout,

Director of the Laboratories

CUT FLOWERS AND HOW TO USE THEM*

This is a plea for flowers. You need flowers now more than you ever needed them before. The longer the war lasts, the more you will need them. Flowers form one of the best antidotes for war horror that you can find. Give them half an hour a day and they will help to keep you normal, sane, poised, for the rest of your day's work.

Just now there is special interest in cut flowers for convalescent soldiers in the army hospitals. Nothing, unless it be a phonograph, brings more pleasure to wounded troopers than flowers. Sometimes a rose or a pink has spelled life to a suffering soldier. For a time there was talk of classing the growing of flowers among the non-essential industries. It is now seen that this would have been a great mistake.

Among the flowers available during the winter season, the carnation is best of all because it keeps longest. Roses make a stronger appeal, perhaps, but their span of life is short. Snap-

* A lecture delivered at the Garden Ocboter 12. While the opening paragraphs make special appeal to war-time needs, it will be seen that their application continues under present conditions.

dragons and stocks do not seem to awaken the same sentiments, although they are good for decorative purposes. Most of the bulbous flowers are welcomed, for there is an innate friendliness about them which reaches the soldier's heart. Truth to tell, potted bulbs are among the best gifts which can be made; but where they cannot be allowed, the cut blossoms may be substituted. It is well, though, to consider the matter of perfume. Heavily scented flowers are apt to be objectionable. Some people cannot bear the odor of tuberoses, freesias, and other highly scented flowers. Gardenia, heliotrope and jessamine are strongly scented, and must be used with care. Violets and lilies of the valley are less objectionable, but offend some people. Few nostrils rebel at the odor of roses, pinks, wallflowers, sweet peas, stocks and tulips, even in a close room.

It is well to learn at the beginning that a few flowers are just as acceptable as a large bouquet. Indeed, they may make a much pleasanter impression.

When growing roses for cutting, give them a retired place in the garden, for they will not make much of a show there. When you are cutting a flower, cut nearly all of the stem, even down to within six or eight inches of the ground, leaving only two or three good eyes or buds. Although this may seem like very drastic treatment, it will result in the growth of new shoots and a new crop of flowers into which the whole vigor of the plant will pass. The best way to keep roses fresh is to cut off the tip of the stems under water. This keeps the air from entering. If you can use very warm water, so much the better. This plan, by the way, is one which is adapted to all hard-stemmed flowers. If you get a box of roses by mail and find them badly wilted, you can adopt no better plan than to fill the bath-tub with water and let the flowers float in it, the entire stems being covered. This is an excellent "pick-me-up" for roses.

It is a pretty good rule that two kinds of flowers should not be displayed in the same vase, except when the combination is made with much care. Carnations, however, are an exception. They are so adaptable that they seem at home in almost any combination. Do not, however, use pink and scarlet carnations together. If there are several vases of red carnations, stand white flowers between them.

There is much which might be said about combining colors, but the whole question is complicated and not very inspiring. As a rule flowers of different colors must be used together with great care. When in doubt stick to solid colors unless you include white. White is a peace maker. If you have two vases, one filled with pink and one with red flowers, set a vase of white blossoms between them. This will keep them from clashing. At the same time, don't use white too freely. There is always danger that it will produce a spotty effect.

Remember that flowers which look well in the day-time may look very badly washed out at night. Violets, for example, are very poor flowers to use by artificial light. Yellows, too, are likely to look bleached, especially by electric light.

Yellow roses are most charming for daylight effects, but beware of them after the lights are on. Pink in its various shades is always pleasing by artificial light. It requires no other color besides the green of its foliage. Pink carnations are among the best of flowers for winter. Avoid all purples at night, but use red with electric lights. In summer you can make generous use of climbing roses. They are beautiful.

Coming back to the violet, we find a flower which is very hard to arrange to good advantage. Probably the best plan to use is this: separate the flowers into little bunches of eight or ten and tie the stems loosely: then thrust them into moss with which the receptacle should first have been filled loosely. In that way they show to much better advantage than when used in a solid bunch of half a hundred. Of course the moss must be kept wet. Although often used alone, it is a pretty variation to mix a few white flowers with the violets. Perhaps lilies of the valley are best for the purpose, but freesias or hyacinths look almost as dainty.

Flowers thrust tightly into a vase will not last long. Thick stems and large leaves that fill the mouth of the vase give little opportunity for air to get in and the plants are smothered for lack of oxygen. Vases with wide mouths are always desirable and a bit of charcoal will help to keep the water sweet. The water should be changed daily in summer and every other day in winter, and it is well to place the flowers in a cool place on the floor at night. If the stems rest on the bottom of the vase, they should

have a slanting cut, in order that the pores may not be sealed up.

Most flowers keep better if half an inch is cut from the end of the stems every other day. Scissors may be used in the garden, but afterwards the stems should be cut again with a sharp knife. The scissors squeeze the ends of the stems and reduce the amount of water which may be taken up. A diagonal cut with a knife has an opposite effect. Don't neglect to keep your flower holders filled with water. It is best to fill them every night, and place them on the floor of the hall where they will be cool. Some fleshy stemmed flowers, like tulips and daffodils, will empty a narrow vase in less than twenty-four hours. You may preserve a single bloom by inserting the stem in a piece of potato or turnip as soon as it has been cut. It will absorb enough moisture when this is done to keep it a long time. Sometimes this plan is used when shipping flowers through the mail.

EDWARD I. FARRINGTON

GEORGE FRANCIS ATKINSON

Professor Atkinson died in the City Hospital, Tacoma, Washington, on November 14, 1918, from pneumonia following an attack of Spanish influenza. He was recently relieved of active work at Cornell University, where he had been head of the Department of Botany since 1896, to prepare his extensive notes and photographs of the fleshy fungi for publication. In order to make this work more complete, he was engaged in collecting fungi in regions he had not previously visited, his last explorations being on Mt. Rainier and about Tacoma.

Professor Atkinson has served as a member of the Advisory Board of *North American Flora*, published by the New York Botanical Garden, since the beginning of that work in 1905; and was an associate editor of the *Botanical Gazette*. His publications cover a wide range of subjects, including plant pathology, morphology, taxonomy, embryology, heredity, life-history, etc. He was the author of a number of botanical text-books and numerous contributions to botanical journals, making a total of over 125 titles.

The enthusiasm and energy displayed by Professor Atkinson in personal research and in directing the investigations of others has scarcely been equaled. To his students in all parts of the country, as well as to his professional associates, his unexpected death comes as a great shock.

W. A. MURRILL

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

AMYGDALACEAE. Peach Family

Prunus. PLUM AND CHERRY

Prunus americana. WILD PLUM.
Location: Fruticetum.
Natural distribution: Eastern United States.

Prunus armeniaca. COMMON APRICOT.
Location: Arboretum.
Natural distribution: China.

Prunus avium. SWEET CHERRY.
Location: Arboretum.
Natural distribution: Europe.

Prunus Besseyi. WESTERN SAND CHERRY.
Location: Fruticetum.
Natural distribution: Central United States.

Prunus cerasifera. CHERRY PLUM.
Location: Arboretum.
Natural distribution: Caucasus and southwestern Asia.

Prunus cerasifera var. **Pissardii.** PURPLE-LEAVED CHERRY PLUM.
Location: Fruticetum.
Horticultural origin.

Prunus Cerasus var. **Rhexii.** DOUBLE-FLOWERED WHITE SOUR CHERRY.
Location: Arboretum.
Natural distribution: *Prunus Cerasus* is a native of Asia Minor, and possibly also of southeastern Europe. This variety is of horticultural origin.

Prunus Cerasus var. **semperflorens.** EVER-BLOOMING CHERRY.
Location: Arboretum.
Horticultural origin.

Prunus fruticosa. DWARF CHERRY.
Location: Fruticetum.
Natural distribution: Central Europe.

Prunus glandulosa var. **glabra albiplena.** WHITE DOUBLE-FLOWERED DWARF CHERRY.
Location: Fruticetum.
Horticultural origin.

Prunus glandulosa var. **trichostyla sinensis.** PINK DOUBLE-FLOWERED DWARF CHERRY.
Location: Fruticetum.
Horticultural origin.

Prunus incana. HOARY CHERRY.
Location: Fruticetum.
Natural distribution: Southeastern Europe and western Asia.

Prunus Mahaleb. MAHALEB CHERRY.
Location: Arboretum.
Natural distribution: Central and southern Europe and the Caucasus.

Prunus maritima. BEACH PLUM.
Location: Fruticetum.
Natural distribution: New Brunswick to Virginia.

Prunus Maximowiczii. MAXIMOWICZ'S CHERRY.
Location: Arboretum.
Natural distribution: Manchuria, Corea and Japan.

Prunus pennsylvanica. WILD RED CHERRY.
Location: Arboretum.
Natural distribution: Northern North America.

Prunus serrulata var. **Asahibotan.** Japanese name: ASAHIBOTAN.
Location: Arboretum.
Natural distribution: Japan. *Prunus serrulata*, the Japanese Flowering Cherry, is native to Japan, and has there given rise to many horticultural varieties.

Prunus serrulata var. **atrorubra.** Japanese name: KIRIN.
Location: Arboretum.

Prunus serrulata var. **bullata.** Japanese name: OJOCHIN.
Location: Arboretum.

Prunus serrulata var. **candida.** Japanese name: ARIYAKE.
Location: Arboretum.

Prunus serrulata var. **classica.** Japanese name: FUGENZO.
Location: Arboretum.

Prunus serrulata var. **classica pulchra.** Japanese name: KO-FUGEN.
Location: Arboretum.

Prunus serrulata var. **conspicua.** Japanese name: OSHOKUN.
Location: Arboretum.

Prunus serrulata var. **decora.** Japanese name: HORINJI.
Location: Arboretum.

Prunus serrulata var. **erecta.** Japanese name: AMANOGAWA.
Location: Arboretum.

Prunus serrulata var. **formossisima.** Japanese name: BENI-TORA-NO-O.
Location: Arboretum.

Prunus serrulata var. **Hizakura.** Japanese name: HIZAKURA.
Location: Arboretum.

Prunus serrulata var. **luteo-virens.** Japanese name: UKON.
Location: Arboretum.

Prunus serrulata var. **Miyoko-zakura.** Japanese name: MI-YOKO-ZAKURA.
Location: Arboretum.

Prunus serrulata var. **nobilis.** Japanese name: YEDO ZAKURA.
Location: Arboretum.

Prunus serrulata var. **Ochichima.** Japanese name: OCHICHIMA.
Location: Arboretum.

Prunus serrulata var. **purpurascens.** Japanese name: KANZAN.
Location: Arboretum.

Prunus serrulata var. **rosea.** Japanese name: SHIDARE-ZAKURA.
Location: Arboretum.

Prunus serrulata var. **sachalinensis.** SAKHALIN CHERRY.
Location: Arboretum.
Natural distribution: Japan, Corea and Sakhalin.

Prunus serrulata var. **sericea.** Japanese name: NADEN.
Location: Arboretum.

Prunus serrulata var. **Shirataye.** Japanese name: SHIRATAYE.
Location: Arboretum.

Prunus serrulata var. **Shiro-fugen.** Japanese name: SHIRO-FUGEN.
Location: Arboretum.

Prunus serrulata var. **subfusca.** Japanese name: SUMIZOME.
Location: Arboretum.

Prunus serrulata var. **tricolor.** Japanese name: GYOIKO.
Location: Arboretum.

Prunus serrulata var. **unifolia.** Japanese name: ICHIYO.
Location: Arboretum.

Prunus serrulata var. **vexillipetala.** Japanese name: HATAZAKURA.
Location: Arboretum.

Prunus serrulata var. **Yoshino.** Japanese name: YOSHINO.
Location: Arboretum.

Prunus serrulata var. **Yoshino-zakura.** Japanese name: YOSHINO-ZAKURA.
Location: Arboretum.

Prunus subhirtella. JAPANESE ROSE-BUD CHERRY.
Location: Fruticetum. Arboretum.
Natural distribution: Japan.

Prunus subhirtella var. **ascendens.** HERINCQUE'S CHERRY.
Location: Arboretum.
Natural distribution: Japan and Corea.

Prunus subhirtella var. **pendula.** JAPANESE WEEPING CHERRY.
Location: Arboretum.
Natural distribution: Japan.

Prunus tomentosa. DOWNY CHERRY.
Location: Arboretum.
Natural distribution: Japan.

Amygdalus. PEACH.

Amygdalus Davidiana. DAVID'S PEACH.
Location: Arboretum.
Natural distribution: China.

Amygdalus Davidiana var. **alba.** DAVID'S WHITE-FLOWERED PEACH.
Location: Arboretum.

CORRECTIONS OF NAMES OF COLOMBIAN PLANTS

The report of "A Botanical Expedition to Colombia" in this JOURNAL for June, pages 117 to 138, was written very soon after my return from that country and before there had been opportunity to check the determinations of the plants referred to. While care was used, it is but natural to discover that some of the field-identifications made upon one's first visit to a country, or indeed to a tropical flora at all, should have been erroneous. Through Dr. Britton's effort nearly the entire collection has now been classified into genera, and this gives the opportunity to make a few needed corrections in the report:

Pages 121, line 17, and 135, line 6—Read *Gliricidia sepium* (Jacq.) Steud. This is the "*Robinia maculata*" of Cortes' "Flora de Colombia," page 242.

Page 126, line 5 from bottom—Read *Hydrotrida* for *Micranthemum*.

Page 127, line 15—The "yellow Gerardioid Scrophulariacea" appears to be a species of *Alectra*, a Brazilian genus not previously reported from Colombia.

Page 129, line 7—Read *Osteomeles* for *Crataegus*.

Page 130, line 9—Read *Aetanthus*, of the Loranthaceae, for *Loranthus*.

F. W. PENNELL

CONFERENCE NOTES FOR NOVEMBER

The monthly conference of the scientific staff and registered students was held on the afternoon of the sixth of November. The program presented was as follows:

"Fleshy cup-fungi of North America," by Dr. F. J. Seaver.

"Notes on recent collections of fungi," by Dr. W. A. Murrill.

The following is a summary of Dr. Seaver's review of his work on the fleshy cup-fungi of North America.

"The so-called cup-fungi include a large group of ascomycetes

in which the fruiting body is predominantly cup-shaped or discoid with the hymenium lining the upper surface, although there are many exceptions to this general rule. In all, however, the hymenium is freely exposed at maturity.

"As pointed out by Boudier, the cup fungi may be divided into two very natural groups, the basis of division being the method of the dehiscence of the ascus. The first, which is called by him the Operculae, may be recognized by the fact that the ascus opens at the apex by a circular lid, which is known as the operculum. It is this group which is referred to under the name of 'fleshy cup-fungi.'

"The second group is known as the Inoperculae since the ascus does not open by means of an operculum but by a simple pore which is formed by the rupture of the ascus. Although the presence of the operculum was noted first by Crouan, it was Boudier who in 1879 first called attention to its significance as a basis of classification.

"While at first thought this might seem an obscure character it is really very distinct and easily recognizable with a little experience. There are, however, a few exceptions to the rule. The exceptions are in the genus *Streptotheca* and occasionally in the very closely related genus *Rhyparobius*. In these exceptions the ascus opens by a transverse slit which becomes bilabiate. Such forms are included with the operculate group.

"As pointed out by Boudier, the spores of the operculate forms are always simple and usually ellipsoid or globose. In the inoperculate forms they are often compound and occasionally much elongated or filiform. Even when simple the spores of the inoperculate group are usually elongated and very narrow. The form of the ascus and spores is usually sufficient for the recognition of the operculate form even though the operculum is not actually seen, although there is not usually much difficulty in observing it especially in fresh material. It is also noted that the inoperculate forms are more xerophytic in their habits than the operculate.

"The fleshy cup-fungi as considered here include most of the large conspicuous species as well as many of the smaller ones, some of which are less than a millimeter in diameter. Among

the operculate species the spores often increase in size in inverse ratio to that of the cups or discs.

"Species whose fruiting bodies are less than a millimeter in diameter often produce spores larger than those of species with fruiting bodies many centimeters in diameter. In the inoperculate group the species with small discs or cups usually produce very minute spores. This relative difference in the size of the spores is a good index to the position of the plants in the scheme outlined above.

"The manuscript on the operculate cup-fungi of North America is practically completed for the North American Flora. This does not mean that the work is completed but only that it has been carried as far as our knowledge will permit us to carry it at the present time. Although a number of new species have been described from time to time, the work will result in a considerable reduction of the total number of species credited to North America."

Dr. Murrill exhibited and discussed a large number of interesting specimens of fungi including some new species which have recently been collected. Descriptions of these species and notes on these collections have for the most part already appeared in printing *Mycologia* or in the *Journal*.

A. B. STOUT,

Secretary of the Conference

NOTES, NEWS AND COMMENT

Through an error by the printers the list of officers and committees of the Torrey Botanical Club appeared on the second cover-page of the November issue of *Journal*, New York Botanical Garden, and the edition was mailed to members before the mistake was discovered. The publications of the Garden and those of the Torrey Botanical Club are printed by the same establishment.

A new and correct set of covers has been ordered printed and distributed to replace the defective ones.

Dr. John K. Small, spent the first part of December in exploration in Florida. He visited the western and southern extremities of the state, as well as many points in the interior of the peninsula, mainly in search of cacti and ferns.

Professor Guy West Wilson, former student and aid at the New York Botanical Garden, has been appointed associate botanist and plant pathologist in Clemson College, South Carolina.

Mr. Clarence Waldron, son of Professor Waldron of North Dakota, called at the Garden recently on his way to France in military service.

Dr. J. F. Brenckle, of North Dakota, called at the Garden recently. Dr. Brenckle is a physician and an enthusiastic mycologist. He has been in the medical service in the army, but is now released.

The following botanists have registered in the library during the autumn: C. A. Reed and Dr. S. F. Blake, Washington, D. C.; Robert K. Miller, Baltimore, Md.; Professor Arthur H. Graves, New Haven, Conn.; Dr. Kwan Koriba, Tokyo, Japan; Professor H. A. Gleason, Ann Arbor, Mich.; Professor Charles S. Boyer, Philadelphia, Pa.; Charles B. Graves, M.D., and Mrs. Graves, New London, Conn.; and Professor Lincoln W. Riddle, Wellesley College.

Mr. Edgar Nelson visited the Garden on December 4 on his way to Porto Rico and gave a brief account at the Conference on his work in Florida, Louisiana and Texas on the citrus canker and the cotton boll-worm. He goes to Porto Rico to continue his work on the control of economic insects.

Among the plants brought to the Garden by Miss Kittredge who collected for Miss Elizabeth Billings in Woodstock, Vermont, the past summer, are several double-fruited forms of *Botrychium*

virginianum. *B. obliquum* is represented by one specimen with double-fruiting frond, and one with triple-fruiting frond. Other species of *Botrychium* show great variation. *Polystichum Braunii* was found by Miss Kittredge at a much lower elevation than previously recorded for the State; one plant was found in a rocky pocket at the base of Mt. Tom, not much above 600 ft., and a colony of 25 or more plants at about 1,000 ft. A large colony of *Malaxis monophylla*, in fruit was found in a moist place near the top of Mt. Tom.

Professor W. W. Rowlee, of Cornell University, recently returned from a botanical expedition to Central America, visited the Garden for investigation during December. He had traveled extensively through Costa Rica, Nicaragua and Guatemala, studying especially trees of the genus *Ochroma*, the balsa-wood. He is engaged in a taxonomic revision of the genus.

Meteorology for November—The total precipitation for the month was 2.55 inches. The maximum temperatures recorded at the Garden for each week were *65° on the 8th*, 63° on the 15th, 62° on the 18th and 56° on the 29th. Minimum temperatures for each week were 26° on the 7th and the 12th, 28° on the 24th, and *24° on the 27th*. The earliest date on which ice completely covered the middle lake was the 24th.

ACCESSIONS

MUSEUMS AND HERBARIUM

107 specimens of lichens from Montana. (Given by Mr. R. S. Williams.)

4 specimens of hepatics from Cuba. (By exchange with Brother Hioram.)

3 specimens of hepatics from Washington. (Collected by Dr. S. M. Zeller.)

20 specimens of flowering plants from Lake Mohonk, New York. (Given by Dr. N. L. Britton.)

14 specimens of foods and aromatics for the Economic Museum. (Collected by Mr. Percy Wilson.)

21 specimens of marine algae from Grand Manan, New Brunswick. (By exchange with the United States National Herbarium.)

12 specimens of *Astragalus* from Oregon. (Given by Professor W. E. Lawrence.)

2 specimens of flowering plants from Montana. (Given by Professor J. E. Kirkwood.)

10 specimens of flowering plants from North Dakota. (Given by Professor O. A. Stevens.)

25 specimens of fruits and vegetables. (Given by Dr. H. H. Rusby.)

4 specimens of coffee. (Given by Mr. Percy L. Johnson.)

13 specimens of woody fungi from Cuba. (By exchange with Brother Leon.)

2 specimens of fungi from New York. (Colected by Dr. W. A. Murrill.)

11 specimens of fungi from New York. (Given by Mrs. L. M. Keeler.)

7 specimens of fungi from the Canadian Rocky Mountains. (By exchange with Mr. Stewardson Brown.)

5 specimens of fungi from New Hampshire. (By exchange with Mr. Charles H. Harris.)

195 specimens of fungi from Porto Rico. (Collected by Prof. F. L. Stevens.)

3 specimens of fungi from New Jersey. (Collected by Dr. F. J. Seaver.)

122 specimens of fungi from Porto Rico. (By exchange with Professor J. A. Stevenson.)

31 specimens of fungi and slime-moulds from New York and vicinity. (Given by Miss Daisy Levy.)

6 specimens of fleshy fungi from New York. (By exchange with Mr. Stewart H. Burnham.)

2 specimens of fungi from Ohio. (By exchange with Dr. Bruce Fink.)

8 specimens of rusts from British Columbia. (Given by Professor E. W. D. Holway.)

1 specimen of rust from California. (Given by Professor E. W. D. Holway.)

4 specimens of fungi from Oregon. (By exchange with Professor F. E. Lloyd.)

1 specimen of fungus from Ontario. (By exchange with Professor John Dearness.)

3 specimens of fungi from New York. (By exchange with Mrs. L. M. Keeler.)

1 specimen of fungus from New York. (By exchange with Mr. K. A. Pauly.)

2 specimens of *Russula* from North Carolina. (By exchange with Professor H. C. Beardslee.)

14 specimens of fibers and drugs. (Given by Dr. H. H. Rusby.)

1 specimen of *Venenarius pantherinoides* from Washington. (By exchange with Miss M. McKenny.)

1 specimen of *Pholiota* from Utah. (By exchange with Professor A. O. Garrett.)

1 specimen of *Corticium* from Colorado. (By exchange with Professor T. D. A. Cockerell.)

320 specimens, "Fungi Malayana" centuries two, three and four. (Distributed by Professor C. F. Baker.)

17 specimens of fungi from Montreal, Canada. (By exchange with Professor R. S. Blair.)

2 specimens of fungi from New York. (By exchange with Mr. F. F. Wilmousky.)

13 specimens of fungi from Colorado. (By exchange with Dr. Joseph Cuneo.)

21 specimens of fungi from Rhode Island. (Collected by Miss Dorothy Hale.)

6 specimens of fungi from New Hampshire. (Collected by Miss Dorothy Hale.)

2 specimens of *Daedalea quercina* from Pennsylvania. (By exchange with Professor A. H. Graves.)

1 specimen of *Lycoperdon giganteum* from New York. (Collected by Miss Dorothy Hale.)

20 specimens of fungi from New York. (By exchange with Mrs. L. M. Keeler and Mrs. I. Martin.)

1 specimen of *Clitocybe subconnexa* from New York. (By exchange with Mrs. L. M. Keeler.)

4 specimens of fungi from New York. (By exchange with Mr. F. F. Wilmousky.)

4 specimens of fungi from New York. (By exchange with Mrs. Wallis Craig Smith.)

1 specimen of *Psilocybe polycephala* from New York. (Collected by Dr. W. A. Murrill.)

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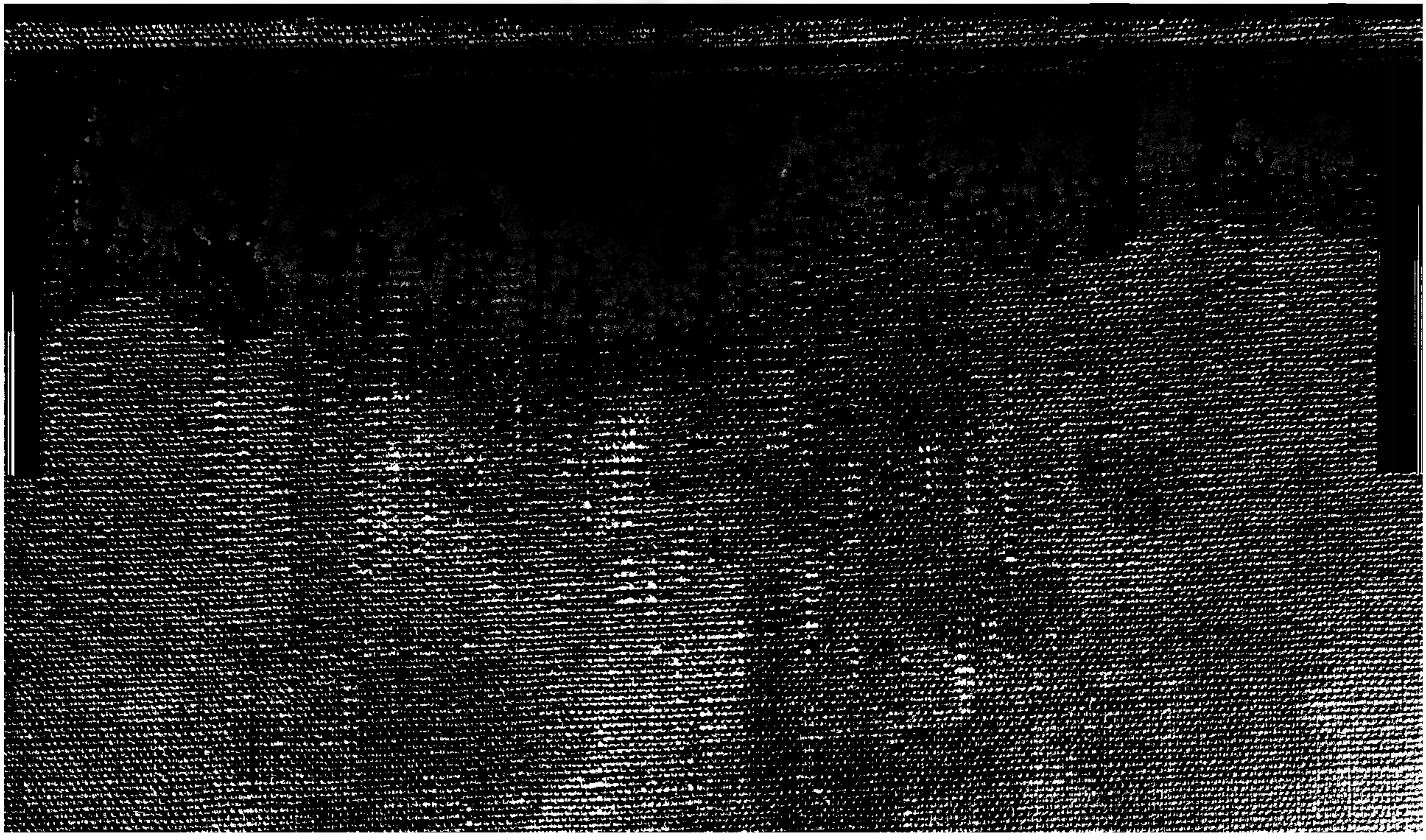

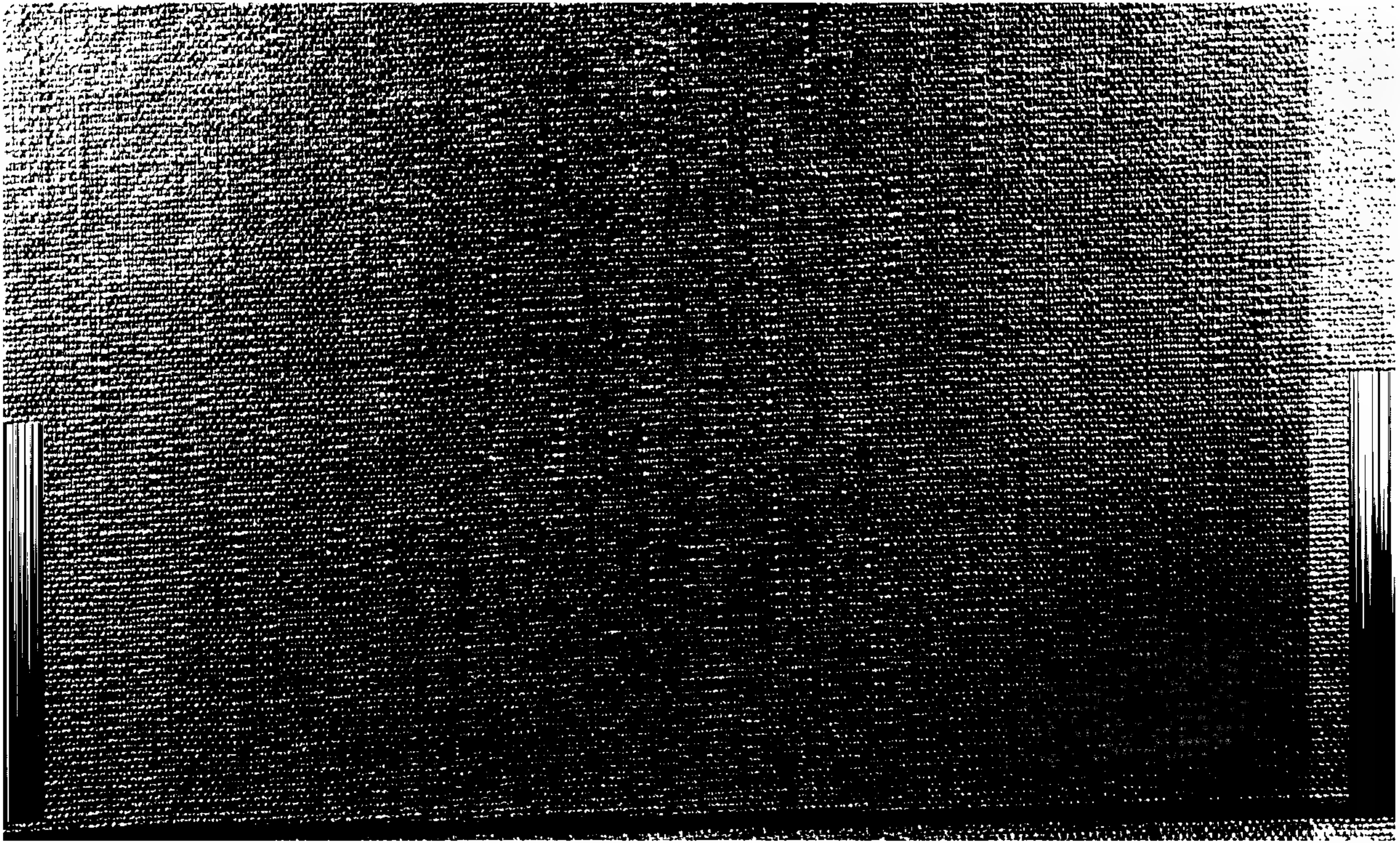

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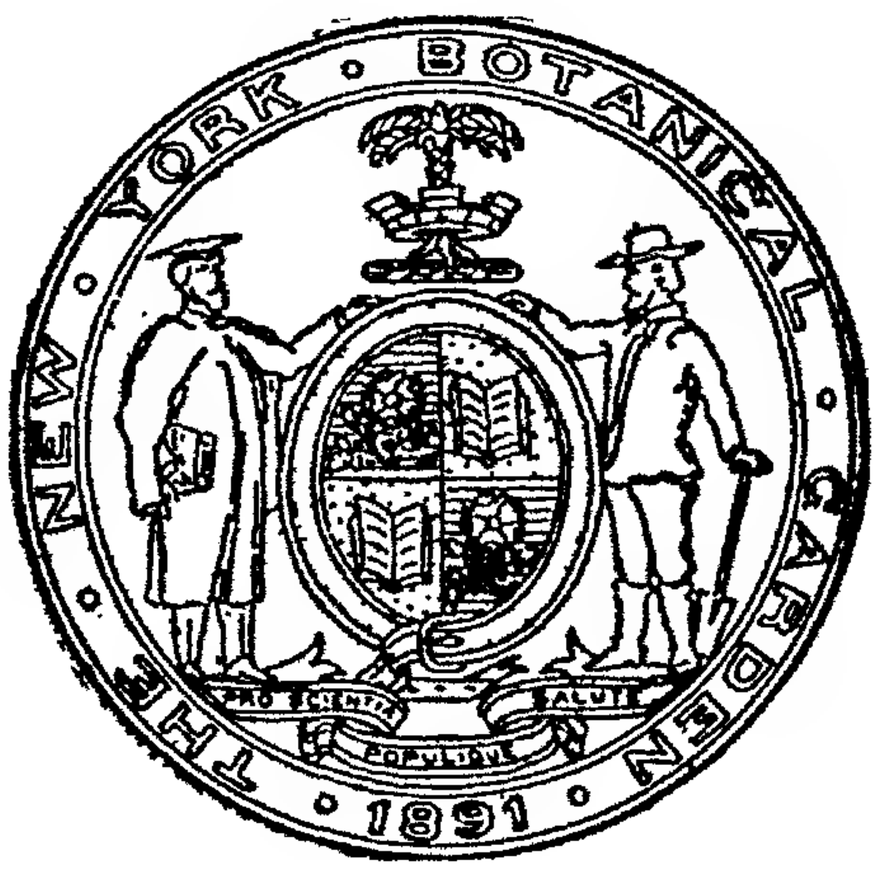

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JOURNAL

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VOL. XX January, 1919 No. 229

THE PLANTING OF TREES AS WAR MEMORIALS

At the annual meeting of the Managers of the New York Botanical Garden on January 13, 1919, the following suggestions by Mr. Edward D. Adams were approved and ordered printed:

At this time, when permanent memorials to the defenders of our flag by land and sea are being considered throughout our land, and projects for community monuments of various designs are planned, we venture the suggestion that individual, as well as associated, action can effectively and economically be taken in honor of all who have served or of those who have made the supreme sacrifice, by planting memorial trees.

Such trees may properly be planted in the front yard, on the street, at the home entrance, in a park, as the decoration of an avenue, in single specimens or in groups of different species for artistic effects of form and color.

As representing sentiments to be long cherished, such memorials would be tenderly cultivated and protected.

Their shade and fruit would yield comfort and satisfaction. Their growth would add value to the home and become an asset that succeeding generations would inherit.

Naturally, only those trees should be selected for memorials to family, school, church, and municipal honor, that will grow best in each locality and of those species that will be appreciated for their beauty, grandeur, long life, and utility.

The number of kinds of trees suitable for memorial planting is large. The widely different climates of different parts of the United States require the selection of such kinds as will grow

vigorously, and the character of the soil should also be taken into consideration; such information to those not versed in tree planting can usually be had from the nearest nurseryman or from officials of the Agricultural Experiment Station.

Those who live in homes without available grounds for planting, might contribute to the cost of a tree for its planting as part of a memorial grove in a park or garden.

The selection of the tree, the preparation of the location, and the design of the label or honor roll, may be considered and carried out in family conferences and with the participation of each member.

These preparations should be made as our men return, so that the signing of the treaty of peace may be celebrated over the nation wide by the simultaneous planting of the honor tree of each family and community that has cherished a service flag in the period of our war.

At the New York Botanical Garden, a war memorial plantation of Douglas Spruce, a characteristic American evergreen tree, will be established this spring; about one hundred trees five feet high having been secured for this purpose. For those who do not have land available and who would like to have a memorial tree planted, the offer is made to designate one of these spruces as desired on receipt of ten dollars, which will cover cost of tree, of planting, and of its care, which will be the same as that of other trees in the Garden.

ALPINE AND ROCK GARDENS

The taste for the cultivation of alpine plants is increasing, and rock gardens are becoming popular. The most successful efforts for establishing alpine gardens are made by those imbued with true scientific spirit. One must have an intense enjoyment in the study of alpines, and in administering to their wants, which latter require an accurate knowledge of their habitats, and of the best conditions for their successful growth.

To him who has traveled in the Alps and has beheld the wealth of color in the higher pastures, alpine plants make special appeal. They recall memories of the days spent in the mountains, when, for the first time he saw them in all the glory of their wild beauty.

As his alpine garden develops, there come to him day by day, memories of rocky fastnesses, bedecked with a flora whose persistence and vigor is well worthy of emulation.

As we look at them in their stone creches, we marvel that such colors, and foliage-masses, can be found in such grim surroundings. There is a charm about them that no other class of plants possesses. Other plants are equally beautiful, but they have not the setting. Our garden flowers may glow in their beauty, yet these mats of green, bedecked with bloom, appeal to us as does many another pretty living thing weaker than ourselves.

Then again alpine gardens give one a pleasing sense of intimacy with nature. Within a small area we have a little world of our own, and each species, requiring as it does our best efforts to supply its needs, gives us the greatest pleasure when it thrives under our tender care.

Within the garden's confines, we can establish hundreds of varieties of the most beautiful and interesting plants which nature with open, though often with reluctant hand, gives to us. If we are really in earnest, she assents to our removal of her treasures from their mountain homes into our imitation, though often no less acceptable, homes, among the rocks and in the cool deep crevices, which they must have to bring forth what is best in them.

Here again we can enjoy the work of increasing them, either by division, cuttings or seeds, curbing aggressive interlopers, and inducing the shy and delicate ones to come forth and blossom as the rose. We become more and more interested, and make a closer study of the plants of the alpine flora, desiring to know more of their requirements, and their place in the economy of nature.

In many rock gardens are grown bulbs, aquatics, herbaceous and other plants that do not properly belong there, and we may conclude that alpine has a wide application, when in truth it has

a very specific meaning. It applies primarily to plants of the Alps, that is, to plants of mountains, for the origin of the word Alp is Celtic, and means mountain, and thus it comes that the term is used for plants which are dwellers in high altitudes of mountains. Their greatest interest is in their adaptability to a long severe winter and a short summer, so that consequently, they develop a close dense habit of growth with small compact leaves, compact stems, and brilliant flowers. Above all, each has a thick mass of strong far-striking roots, that pierce the scanty soil between the rock crevices, and thus secure to the plant a supply of food which carries it through to fructification, or else fills the storehouses that carry it through the long trying winter. Then again because of the close mats of foliage developed, evaporation is reduced to a minimum, and, as this foliage is retained throughout the year, these alpines are really evergreen. Thus they make provision for a short summer, and a long winter. They thrust their roots far down into the crevices, where the rains and the melting snows have accumulated stores of moisture.

In their alpine homes, they have the protection of the dry snows, and do not suffer from the heavy winter rains that prevail in our climate. With us they will not receive that degree of intense light that prevails in their eyries during the brief summer, and yet our longer periods of light, compensate somewhat for alpine intensity.

Rock gardens may, and often do, contain a great variety of plants, annuals, biennials, bulbous and herbaceous forms; and even small shrubs may be introduced into the background and higher portions.

If one has glacially worn rocks, a moraine garden may well be placed at its base where the drift would naturally remain. In this mass of gravel and pebbles, one can grow with great success a variety of plants that need such cool moist situations. One need not hesitate about starting an alpine garden, for alpines, if given an opportunity, have a capacity for adapting themselves to circumstances, a capacity that has been latent in each species for many generations. As we endeavor to give to each the near-

est approach to the conditions which prevail in the habitats from which they have been removed, we are quite sure to reap that reward which modesty and exquisite beauty always brings to the earnest and ardent lover.

EDMUND BRONK SOUTHWICK.

INSECTS ATTACKING SHADE TREES

This subject has been repeatedly brought to the attention of members of the Garden, both by Dr. Seaver and myself; because these foes of trees and other plants are ever with us and eternal vigilance is necessary to keep them under control.

Insects attacking shade trees may be divided into three classes: those which devour the foliage, those which suck the juices of the leaves or bark, and those which bore into the wood. The elm leaf-beetle and caterpillars such as the fall web-worm, the tent-caterpillar, and the larvae of the tussock moth are well-known examples of the first class. Such insects defoliate shade trees, destroying their beauty and efficiency in summer and rendering them liable to injury in winter on account of the immature wood formed during renewed growth in autumn.

The aphis, the red spider, the scales, and other sucking insects are less conspicuous but no less injurious than the leaf-eaters. The aphis, for example, not only injures the leaves upon which it feeds but asphyxiates those below by covering them with honey-dew. The punctures of the red spider cause drying and decay of the surrounding tissues and also weaken the leaves and open a way for the entrance of leaf-destroying fungi.

Members of the third class are rarely seen and their presence often not even suspected until the tree attacked is dead, since their work is done inside the trunk and branches. Healthy trees do not as a rule suffer seriously from this class of insects. The most destructive borer in the vicinity of New York City is the European leopard moth, which attacks trees in vigorous health and is the cause of most of the dead branches seen upon the elm and silver maple. This insect and the leaf-beetle have so

preyed upon the elm as to render the advisability of its further use as a shade tree in this city extremely doubtful.

Trees that are regularly and seriously attacked by insects difficult to control should not be planted. There are other species, among which are some of our most popular trees, that require careful and at times expensive treatment if their vigor and beauty are to be preserved. Villages and towns not provided with spraying apparatus might well abandon these trees and use for their principal plantings species less subject to insect attack.

The tussock moth and a few other caterpillars will, unfortunately, devour almost any kind of foliage and must receive special treatment. Caterpillars that make large webs may be easily located and removed by clipping off the branch containing the web before the insects are mature. The practice of burning them out is usually attended with more or less injury to the tree.

The eggs of certain caterpillars are deposited in clusters on the twigs of trees and may be easily collected and destroyed. The tussock moth deposits its eggs on the empty cocoon from which it has emerged. These frothy egg-masses are usually conspicuous on the trunks and larger branches of trees during autumn and winter, and may either be killed in place by moistening them with creosote oil or removed with scrapers and burned. Cocoons without egg-masses probably contain parasites and should be left undisturbed. In many cities, school children have been successfully enlisted in destroying these and other egg-masses.

Shade trees are often disfigured and at times seriously damaged by various appliances and mixtures intended to prevent caterpillars from crawling up their stems. Such methods of destruction are rarely effective and their general use should be discouraged.

Leaf-eating insects are easily controlled by spraying with some poison, like lead arsenate; sucking insects must be covered with soap solution or other substance that will interfere with their breathing apparatus; while borers must be reached in their tunnels with a knife or wire, or some poisonous gas like carbon bisulfid.

W. A. MURRILL.

SOME BOOKS FROM COLOMBIA

When in Bogotá in 1917 I had opportunity to search for botanical books. While I was rewarded by few findings and perhaps none of these of much value to a professional book-hunter, still the four works discovered and brought back with me seem to have been nearly or quite unknown in this country. The first and third contain descriptions of species published as new to science, and none of these were entered in the Card-Index, our standard for the enumeration of new species of American plants.

First and most important is the "Flora de Colombia," published in Bogotá in 1897. This is by Santiago Cortés, a native Colombian whom I had the pleasure of meeting there. Prof. H. H. Rusby, who had left me in Bogotá in August, had taken with him the last copy for sale at the Libreria Colombiana, the main bookstore. My copy is from Sr. Cortés himself and is now much worn, both from his own long usage and from my six months' use of it while traveling through the country. It seems strange, really almost unbelievable, that a work of such scope and so well deserving wide recognition should apparently have remained absolutely unknown to botanists in the United States until our very recent expedition.

The copy before me, of 286 pages, is marked "volumen primero," and was designed as but the beginning of a very elaborate comprehensive treatise of the flora of Colombia. But immediately after 1897 came several years of revolution, depleting the country, and scientific undertakings are so remote from economic life that they suffer severely at such times. So it is that of Cortés' flora five volumes remain unpublished. An additional advertising page, which would be number 287, informs us of the scope planned for each of the other volumes. These include a series of systematic monographs of families for their purely scientific interest, accounts of species for their medical or industrial value, a complete enumeration of species with geographic and popular information, and lastly an atlas with chromo-lithographs and engravings in black. All his life Sr. Cortés has been an enthusiastic amateur artist of plants, and at his home he showed me a

very considerable collection of the illustrations planned for this iconography.

The volume published, dedicated to one of the finest of Colombia's scholars and statesmen, Michael A. Caro, after a brief geological introduction, divides into three portions. The first part, the therapeutic flora, runs over the vegetation of the country, for the dicotyledons family by family, listing the best-known and especially the medicinal species, and making for each some entry of locality and of medicinal use. Often the latter entries are quite full, and while I am little qualified to judge, I should suppose that this is a mine of valuable observations. The monocotyledons and higher cryptogams are not so fully entered, although he has much to say of these. An industrial flora follows on pages 132 to 151, similar in treatment but much briefer. To me in my travels in remote sections of the country the most valuable portion of the book is the third, the "index" of the common names of the plants used in Colombia. This embraces pages 153 to 275, and is much more than an index. Each entry contains the scientific name of the species, and very generally notes of occurrence and uses. In a country where physicians and medicines are rare and few, the people pay that close attention to the flora which must have characterized the English in the times when our wealth of English names came into being, and so it is but natural to find almost every Colombiano well versed in plant names. To a novice, Cortés' index was indeed a key to the more important part of the flora.

Now a word as to Señor Cortés himself. In Spanish America, Colombia has been remarkable and unique in the long series of lonely or nearly lonely botanists which she has produced. It seems to be in line with the peculiar merit of Colombia's culture, in certain ways the finest, though not the greatest or at all the most broadly diffused, in the Spanish New World. First there was Mutis, the monk who came with Spanish training and afire with enthusiasm to explore the botanical unknown of New Granada's river-valleys and mountain-chains. Then there was Caldas, the patriot-martyr, a botanist as well as physicist, one of the minds of greatest scientific promise that the New World has

ever produced. He was a native Colombian, although living before the land had received that name. Next came Triana, the Colombian who has achieved most in botanical research, who worked through the middle of the nineteenth century. His scientific volumes are monumental, although it is characteristic of patronage of science there that they had to be published mostly abroad. Bogotá contains many reminiscences of him and I can scarcely refrain from repeating some. Señor Cortés follows him and appears as his rightful successor, in his enthusiastic devotion, at considerable pecuniary loss, to botany. He has given his life to the science he loves, and that in a land where he is almost without a comrade in this particular field.

Dr. Cuervo, Carlos Cuervo Marquez (following Spanish custom, the name of his mother's family follows his patronymic), has been Sr. Cortés' main appreciator in Bogotá. He is a physician of prominence. He has published for use in schools a "Tratado Elemental de Botanica" (Elementary Treatise of Botany), also printed in Bogotá, in 1913. This is divided into three parts, organography, vegetable physiology, and vegetable taxonomy. The last is the longest. While appearing to be a most helpful work, and in its country more needed than such a book as that of Cortés, for students abroad it is of much less significance.

The third Colombian botanical book I found by chance. It is the "Estudios Cientificos del Doctor Andres Posada" (Scientific Writings of Dr. Andres Posada), and, to fill out in English the subtitle, "with some other writings of his on diverse themes." Truly the themes are diverse on which this professor of the University of Medellin discourses. I open on trigonometry, then physiology, then an account of his home city, Medellin, then a treatise on the serpents of Colombia, on the fish of Colombia, on the Hymenoptera, on the *Vanilla*, proposing two species as new, etc. A considerable number of short botanical papers, frequently descriptive of new species, occur scattered throughout. Equally unknown to the zoologists, as these had been to us, were the descriptions of new species of animals, ranging from insects to frogs and salamanders. Of course it is well that we should discover such volumes—this was published as long ago as 1909

—but isolated authors would do us a favor and help themselves materially as well if they would send to leading foreign institutions copies of their works. One single copy of these studies in a scientific library in this country would have put us in touch with the late Dr. Posada.

The fourth work is of least consequence botanically, and may be well-known to geographers. This is the "Estadistica Natural del Estado Zulia (Venezuela)," by José I. Arocha, published at Maracaibo in 1897. The "Natural Statistics of the state of Zulia" is largely geological and topographical, but the fourth part, embracing about half the work, and of over 200 pages, is biological, and again about half of this is botanical. Economic and otherwise important plants are entered with considerable account of each, but to taxonomists the work probably has slight interest.

Still a fifth work may be mentioned. This is one seen in an old bookstore in Bogotá, but not purchased, as I then supposed our library already contained it. We have made a special study of the flora of the island of Curaçao in the Dutch West Indies, and this "Compendio de Botanica Elemental," by C. Hurtado, was published there in 1891. It is a text-book of elementary botany, of 433 pages, for the use of South American schools and lyceums. It was written in Venezuela, and that it was only later planned at all for Curaçao is shown by the fact that mention of that island is confined to an appendix treating of its flora. In footnotes a few new plant names are mentioned, though but one of these, *Iris Benitesia*, of which fortunately I copied a description, is validly published. An interesting connection of this work with those of Colombia, making it a logical outcome of the scientific tradition of Mutis and Triana, is that Sr. Hurtado is a graduate of the University of Bogotá.

FRANCIS W. PENNELL.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Amygdalus persica var. **albo-plena.** WHITE DOUBLE-FLOWERED PEACH.

Location: Arboretum.

Natural distribution: *Amygdalus persica* is a native of China. This variety is of horticultural origin.

Amygdalus persica var. **roseo-plena.** ROSE DOUBLE-FLOWERED PEACH.

Location: Arboretum.

Amygdalus persica var. **rubro-plena.** RED DOUBLE-FLOWERED PEACH.

Location: Arboretum.

Amygdalus triloba var. **plena.** DOUBLE-FLOWERING PLUM.

Location: Fruticetum.

Natural distribution: *Amygdalus triloba* is a native of China. This variety is of horticultural origin.

Padus. WILD CHERRY

Padus nana. CHOKE CHERRY.

Location: Arboretum. Fruticetum.

Natural distribution: Eastern North America.

Padus nana var. **leucocarpa.** YELLOW-FRUITED WILD CHERRY.

Location: Arboretum.

Padus Padus. BIRD CHERRY.

Location: Fruticetum.

Natural distribution: Europe and Northern Asia.

Padus virginiana. WILD BLACK CHERRY.

Location: Common about the Garden grounds.

Natural distribution: Eastern North America.

CAESALPINACEAE. Senna Family

Cercis. Judas-tree

Cercis canadensis. American Judas-tree.

Location: Fruticetum. Arboretum. West Border. Border at approach to Elevated Railraoad.

Cercis canadensis var. **alba.** White-flowered American Judas-tree.

Location: Fruticetum.

Cercis chinensis (*Cercis japonica*). Asiatic Red-bud.

Location: Fruticetum. Near Power House no. 1. Aquatic Garden.

Gymnocladus. Kentucky Coffee-tree

Gymnocladus dioica. Kentucky Coffee-tree.

Location: Arboretum. Fruticetum. Along path from Museum fountain to 200th Street entrance.

Natural distribution: Central United States.

Gleditsia. Honey Locust

Gleditsia aquatica. Water Locust.

Location: Arboretum.

Natural distribution: Southeastern United States.

Gleditsia triacanthos. Honey Locust.

Location: Arboretum. Along path from Museum fountain to 200th Street entrance.

Natural distribution: Eastern North America.

FABACEAE. Pea Family

Sophora. Sophora

Sophora japonica. Japan Pagoda Tree.

Location: Arboretum.

Natural distribution: China.

Sophora viciifo'ia. Vetch-leaved Sophora.

Location: Fruticetum.

Natural distribution: China.

Cladrastis. American Yellow Wood

Cladrastis lutea. American Yellow Wood.

Location: Arboretum. Along path near Conservatory Range 1. South of the Mansion.

Natural distribution: Southeastern United States.

Maackia. Asiatic Yellow Wood

Maackia amurensis var. **Buergeri.** Japanese Yellow Wood.

Location: Arboretum.

Natural distribution: Japan.

Genista. Genista

Genista tinctoria. Dyer's Greenweed.

Location: Fruticetum.

Natural distribution: Europe and western Asia.

Laburnum. Golden Chain

Laburnum Laburnum. Golden Chain.

Location: Arboretum. Fruticetum.

Natural distribution: Southern Europe.

Cytisus. Trefoil

Cytisus hirsutus. Hairy Trefoil.

Location: Fruticetum.

Natural distribution: Central and southern Europe and the Orient.

Cytisus nigricans. Blackish Trefoil.

Location: Fruticetum.

Natural distribution: Central Europe.

Cytisus nigricans var. **elongatus.** Slender Blackish Trefoil.

Location: Fruticetum.

Cytisus praecox. Early Trefoil.

Location: Fruticetum.

Horticultural origin.

Cytisus scoparius. Scotch Broom.

Location: Fruticetum.

Natural distribution: Europe.

Cytisus scoparius var. **Andreanus.** CRIMSON-WINGED SCOTCH BROOM.

Location: Fruticetum.

Cytisus supinus. DENSE-FLOWERED TREFOIL.

Location: Fruticetum.

Natural distribution: Southern Europe.

Amorpha. FALSE INDIGO

Amorpha canescens. LEAD-PLANT.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Amorpha fruticosa. COMMON FALSE INDIGO.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Amorpha glabra (*Amorpha montana*). MOUNTAIN FALSE INDIGO.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Amorpha tennesseensis. TENNESSEE FALSE INDIGO.

Location: Fruticetum.

Natural distribution: Tennessee.

Amorpha virgata. WAND FALSE INDIGO.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Kraunhia. WISTERIA

Kraunhia floribunda. JAPANESE WISTERIA.

Location: Fruticetum.

Natural distribution: Japan.

Kraunhia floribunda var. **alba.** WHITE-FLOWERED JAPANESE WISTERIA.

Location: Fruticetum.

Kraunhia floribunda var. **macrobotrys.** LONG-RACEMED JAPANESE WISTERIA.

Location: Viticetum.

Kraunhia floribunda var. **violaceo-plena.** DOUBLE-FLOWERED JAPANESE WISTERIA.

Location: Fruticetum.

CONFERENCE NOTES FOR DECEMBER

A conference of the Scientific Staff and Registered Students of the Garden was held on the afternoon of December 4.

Mr. Edgar Nelson spoke briefly of his scientific work since he was a student at the Garden in 1913–14, reporting especially on inspection and control of the citrus canker in Florida and on measures employed in Texas for the eradication of the Argentine ant which has recently been introduced.

Dr. H. A. Gleason, associate professor of botany at the University of Michigan and a former student of the Garden, was present and reported on his studies of the genus *Vernonia*. The following is an abstract of his discussion.

"Among the sixty or more species of *Vernonia* in the West Indies, there are two introduced species, each representing a distinct section of the genus and two species without any close relationships. There are two or three groups of species without relatives in the West Indies. One group of four Cuban species finds its nearest relatives in Mexico and Central America. Among the other West Indian species which are of South American derivation, the simplest type of inflorescence, a bracted scorpioid spike, occurs in several species distributed as far west as Jamaica. From this simple type, other types of inflorescence have been developed, characterized by shorter and more leafy spikes and by differences in the position of the next vegetative branches. Each stage in the development of the inflorescence is associated with a more westerly distribution, culminating in the species of the Bahamas and Cuba.

"Forms of *Vernonia* which are apparently hybrids occur commonly in the United States. They are found only in the overlapping ranges of each of the supposed parents, whose morphological characters they combine. In many specimens, the achenes are shriveled below and plump only near the apex, indicating their probable sterility."

A. B. STOUT,
Secretary of the Conference.

NOTES, NEWS AND COMMENT

Corporal Kenneth R. Boynton, Head Gardener's Assistant and recently editor of the *Journal*, is expecting to be released from the United States Army in February. He entered the service last May and has been stationed at Camp Hancock, Augusta, Georgia, where he was assigned to the Department of Personnel, assisting in the psychological examination of recruits and in clerical work.

Mr. Truman G. Yuencker, of the University of Illinois, was here for a day recently. He is engaged upon a monographic study of the genus *Cuscuta*.

Volume 32, part 1, of *North American Flora*, containing descriptions of a part of Rubiaceae, by Paul C. Standley, appeared December 28, 1918. It was followed two days later by volume 22, part 6. This contained the concluding pages of Rosaceae (chiefly the genus *Rosa*), by P. A. Rydberg, and the additions and corrections to the first 236 pages of the volume. It is expected that the part needed to complete volume 22 will appear during the present year.

On January 11, about thirty students from Hunter College visited the Garden Museum under the direction of their instructor, Miss Alice W. Wilcox. The object of the visit was to make a study of the collections of fungi and algae to supplement the regular college work in these courses. Dr. Howe acted as guide to the algae and Dr. Seaver to the fungi. Emphasis was laid on the economic uses of these plants.

A large collection of flowering plants from different parts of Cuba has recently been received for the herbarium. These collections supplement those made several years ago by members of the Garden staff.

A set of over one hundred specimens of lichens from Montana has been incorporated in the lichen herbarium. These were collected on the eastern and western slopes of the Rocky Mountain Divide between the years 1887 and 1898 by Mr. R. S. Williams, who presented them to the Garden.

Professor F. S. Earle has been sending a number of specimens of woody and fleshy fungi to the Garden herbarium from Porto Rico, where Mr. Edgar Nelson has now joined him. Regarding the gill-fungi, Professor Earle remarks, under date of December 24, "They are certainly very rare in the region of Rio Piedras, being chiefly represented by species of *Marasmius* and *Lepiota*. They are very local and only appear when weather conditions are just right. I do not doubt, however, that the Island will yet afford a long list of them."

The unusually mild weather has caused the collecting season for fungi to be considerably prolonged. Friends of the Garden sent in a number of specimens for the herbarium which were collected in a fresh, growing condition during the Christmas holidays and early in January.

The second volume of H. L. Gerth Van Wijk's *Dictionary of Plant Names* has recently reached the library. This work, which forms an index to the preceding volume, contains the vernacular names in English, French, German and Dutch, as well as many names in colonial use. The book, which is published by the Dutch Society of Sciences in Haarlem, should prove of considerable value as a work of reference.

Meteorology for December.—The total precipitation for the month was 3.27 inches all of which fell as rain. The maximum temperatures recorded at the Garden for each week were 51° on the 8th, 57° on the 15th, 55° on the 20th, and *60° on the 23d.* Minimum temperatures were *19° on the 2d and the 7th*, 22° on the 11 and the 19th, and 20° on the 29th.

Meteorology for the year 1918.—The total precipitation at the New York Botanical Garden for the year was 37.98 inches. The distribution by months was as follows: January, 3.86 (including 16.5 inches snow); February, 2.59 (including 2.5 inches snow); March, 1.12; April, 2.36; May, 7.80; June, 4.36; July, 4.11; August 2.55; September, 2.83; October, 0.58; November, 2.55; and December, 3.27.

The maximum temperature for the year was 105° on the 7th of August. The minimum was −6° on the 5th of February. The first hard-killing frost of the autumn was on the morning of November 6 with a temperature of 30°. The earliest date on which ice completely covered the "middle lake" was the 24th of November.

ACCESSIONS

MUSEUMS AND HERBARIUM

2,200 specimens of flowering plants from the Philippine Islands. (By exchange with the Bureau of Science, Manila.)

21 specimens of flowering plants from the coastal regions of the southeastern United States. (By exchange with the U. S. Department of Agriculture.)

284 specimens of flowering plants from Argentina. (Collected by Mr. Walter Fischer.)

46 specimens of flowering plants from South Carolina. (Given by Rev. John Davis.)

300 specimens of flowering plants from Texas. (Collected by Prof. Albert Ruth.)

750 specimens of flowerless and flowering plants from Florida. (Collected by Dr. John K. Small.)

425 specimens of flowering plants and ferns from Cuba. (By exchange with Brother Leon.)

2 specimens of mosses from Maine. (By exchange with Mr. E. B. Chamberlain.)

3 specimens of mosses from the Bahamas. (By exchange with Mr. L. J. K. Brace.)

2 specimens of mosses from North Carolina. (Given by Dr. A. LeRoy Andrews.)

35 specimens from Canadian Rocky Mountains. (By exchange with Mr. Stewardson Brown.)

8 specimens of mosses from Cuba. (By exchange with Brother Hioram.)

30 specimens of mosses from Oregon. (Given by Professor Wm. E. Lawrence.)

72 specimens of algae from Washington. (Collected by Dr. S. M. Zeller.)

32 specimens of hepatics from Cuba. (By exchange with Brother Leon.)

68 specimens of flowering plants from Utah and Colorado. (By exchange with Professor A. O. Garrett.)

1 specimen of *Scleroderma verrucosum* from New York. (By exchange with Mr. John Enequist.)

1 specimen of *Steccherinum septentrionale* from Massachusetts. (By exchange with Miss Grace P. Johnson.)

3 specimens of fungi from New York. (By exchange with Professor H. M. Fitzpatrick.)

1 specimen of *Creonectria coccinea* from Pennsylvania. (By exchange with Professor H. M. Fitzpatrick.)

3 specimens of woody fungi from Sullivan County, New York. (Collected by Mr. Percy Wilson.)

40 specimens of fleshy and woody fungi from Porto Rico. (By exchange with Professor F. S. Earle.)

2 specimens of fungi from Arkansas. (By exchange with Dr. J. F. Brenckle.)

15 specimens of fungi from Porto Rico. (By exchange with Prof. F. S. Earle.)

19 specimens of fungi from Porto Rico. (By exchange with Prof. F. S. Earle.)

1 specimen of *Hymenogaster* from South Carolina. (By exchange with Professor Guy West Wilson.)

1 specimen of fungus from New York. (By exchange with Mr. W. H. Ballou.)

10 specimens of fungi from Porto Rico. (By exchange with Prof. F. S. Earle.)

1 specimen of *Pyropolyporus Everhartii* from New Jersey. (By exchange with Prof. A. H. Graves.)

234 specimens of flowering plants from Alaska. (By exchange with A. P. Anderson.)

213 specimens of rice. (Given by Mr. E. B. Southwick.)

5 specimens of mosses from Me., N.H., & Conn. (By exchange with Miss Annie Lorentz.)

21 specimens of mosses from Washington. (By exchange with Dr. S. M. Zeller.)

2 specimens of mosses from Florida. (Collected by Miss Jeanette P. Standley.)

136 specimens of mosses and hepatics from Cuba. (By exchange with Brother Leon.)

60 specimens from Greenland. (Collected by Dr. E. O. Hovey.)

290 specimens of ferns and flowering plants from Cuba. (By exchange with Brother Hioram.)

176 specimens of flowering plants from Curacao. (By exchange with Harvard University.)

2 specimens of peanuts. (Given by Dr. H. H. Rusby.)

On edge of prairie west of Lake George, Florida, December 6, 1918.—*Opuntia ammophila* with stout trunk and many branches. Notice the abundant long and slender spines and the small fruits. This is the most abundantly fruited prickly-pear in Florida, except *O. Dillenii*. Owing to the lateness of the season most of the berries have fallen. In spite of the vicious armament the half-wild cattle of the region browse on the young joints of these large plants which often grow in quite extensive colonies.

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THE PRICKLY PEARS OF FLORIDA

(WITH PLATES 224, 225, 226)

Succulent plants grow in most parts of the world; but America can justly claim the most peculiar group of succulents, as well as one with almost endless variety in form.

Since the discovery of America, the cacti have been of general or particular interest to all who have come into contact with them. The early adventurers in the New World, and the explorers, were quick to make the acquaintance of these plants, as is evidenced by the prompt introduction and naturalization of several kinds of prickly-pears in southern Europe, northern Africa, and western Asia. Later others became naturalized in southern Africa, in the East Indies, and in Australia.

The history of the genus *Opuntia* in Florida is quite simple. Reference to this group of plants doubtless exists in the records of the early Spanish expeditioners; but the botanical history apparently dates from the publication of Bartram's "Travels"[1] in which William Bartram gives an account of a large prickly-pear then native in the wilderness lying west of Lake George in the peninsula. This locality was recently visited by the writer, who thus made the first botanical pilgrimage to that still uninhabited region since the Bartrams were there nearly a century and a half ago.

During the last century, as far as well-known descriptive

[1] Travels through North and South Carolina, Georgia, East and West Florida, 161.

floras are concerned: Michaux (1803)[1] does not extend the geographic range of Opuntia south of the Carolinas, Pursh (1814)[2] similarly limits the range southward, Nuttall (1818)[3] extends the range to Florida, and Darby (1841)[4] records a single species as being common in the southern states, while Chapman (1860, 1883, 1897),[5] records four species for the state. The latest American monograph[6] of the genus *Opuntia* cites only two species as growing in Florida.

The writer became interested in the prickly-pears of Florida in 1901, when an upright plant with copiously tuberous roots was discovered at Miami. This plant was later described as *Opuntia austrina* and represents the widespread inland species of peninsular Florida. For a decade my work was confined mainly to tropical Florida, and aside from the species just mentioned, only the common and widely distributed coastal forms were encountered. However, a few years ago when opportunities to travel more extensively in the state presented themselves, various heretofore unobserved kinds of prickly-pears came to light. Many parts of the state have now been visited; but little known, as well as almost wholly uninhabited extensive areas, both in the interior and in the eastern and western coastal regions and the unknown country back of Cape Sable still remain to be explored.

In addition to field observations, we have had the advantages offered by the extensive cactus plantation of Mr. Charles Deering at Buena Vista, Florida, in which the writer has had all possible facilities extended to him and where he has introduced to cultivation the species and forms of cacti he has met with in Florida and the other southeastern states. In this plantation, where the prickly-pears have nearly or quite natural conditions and a continuous growing season for twelve months each year, it has been possible to study and compare the vegetative and floral

[1] Flora Boreali-Americana 282.
[2] Flora Americae Septentrionalis 327.
[3] Genera of North American Plants 1: 296.
[4] Botany of the Southern States, 322.
[5] Flora of the Southern United States, ed. 1 and 2, 144, ed. 3, 171.
[6] Contributions from the National Herbarium 3: 355–462.

characters of the several kinds under consideration. Anyone interested in the prickly-pears may secure joints for propagation from the plants growing in the garden at Buena Vista, by addressing the author of this paper.

In 1832 Rafinesque writes thus:[1] "having seen in gardens and herbals several rare or new sp[ecies] of Florida, I will here describe some of them." The first species proposed is *Opuntia* (*Cactus*) *maritima* and is said to grow on the seashore from Florida to Carolina. However, Rafinesque's own reference to a previously published work[2] shows that the name is really founded on a description of Elliott.[3] The second species proposed is *Opuntia* (*Cactus*) *Bartrami* and is founded on the account of an *Opuntia* in Bartram's "Travels" referred to in the earlier part of this paper. A third species proposed is *Opuntia spinalba* founded on a *Cactus Opuntia* of Lunan. It is said to have grown on the Keys of Florida.

The following schedule is offered as a tentative interpretation of the Florida prickly-pears. The notes and descriptions are based mainly on observations made on plants in the field and on specimens grown in the garden referred to in a preceding paragraph, and in the greenhouses of the New York Botanical Garden.

Interesting discoveries of cacti in Florida have not been confined to the genus *Opuntia;* but different genera have been represented as well. A subsequent paper will deal with other genera of the Cactaceae.

The present era in the studies of prickly-pears dates from the publication of "A Preliminary Treatment of the Opuntioideae of North America,"[4] in 1908, by Dr. N. L. Britton and Dr. J. N. Rose. In this paper four species of *Opuntia* were recorded from Florida and correctly so as far as the flora of the state was then known.

Publication of this paper is made at this time in order that it may be cited in the forthcoming first volume of the Monograph

[1] Atlantic Journal 146.
[2] Medical Flora **2**: 247. 1830.
[3] A Sketch of the Botany of South Carolina and Georgia **1**: 537. 1821.
[4] Smithsonian Miscellaneous Collections **50**: 503–539.

of Cactaceae by Dr. N. L. Britton and Dr. J. N. Rose, now in press for the Carnegie Institution of Washington.

KEY TO THE GROUPS AND THE SPECIES

Plants with essentially uniform joints, or sometimes with the joints of the main stem more or less fused into a flattened or subterete trunk; berries constricted or narrowed at the base.

Stems and branches with firmly attached joints: fruits persistent; plants typically freely flowering.

Mature spines white or uniformly gray.

Plants with armed joints (joints or whole plants sometimes individually unarmed); joints of the branches relatively small (less than 2 dm. long): berries purple or red.

Mature plants prostrate, or erect and bushy or diffuse, the joints not fused into a trunk. I. TORTISPINAE.

Mature plants erect, with the joints of the stem fused into a subterete trunk which is divided above into few or many spreading branches. II. AMMOPHILAE.

Plants with unarmed joints (joints sometimes individually weakly armed with white spines): joints of the branches relatively large (over 2 dm. long): berries red or orange, said to be sometimes yellow. III. FICUS-INDICAE.

Mature spines yellow, dark-red, or brown, uniform, discolored, or banded.

Mature spines yellow, or slightly discolored, stout and more or less curved, or very short and *mostly hidden in the areolae, not* closely spirally twisted: berries narrowly pyriform to obovoid. IV. DILLENIANAE.

Mature spines red or brown, banded in our species, closely spirally twisted: berries roundish pyriform, conspicuously turgid. V. ELATIORES.

Stems and branches with loosely attached joints, these readily separating when shocked or touched: fruits early deciduous: plants not freely flowering, but freely propagating by the easily scattered joints. VI. CURASSAVICAE.

Plants with elongate terete continuous stems, or stem and main branches, the branchlets of thin, flat, dilated joints: berries broadly rounded at the base. VII. BRASILIENSES.

I. Tortispinae

Plants prostrate, the stem and branches often forming depressed mats of joints: joints dark-green.

Corolla of numerous petals: berries clavate, over 4.5 cm. long. 1. *O. lata.*

Corolla of few petals: berries short-obovoid, less than 3.5 cm. long. 2. *O. Pollardi.*

Plants erect, sometimes copiously branched, thus bushy and diffuse: joints pale-green. 3. *O. austrina.*

II. Ammophilae

Plants tree-like, the stout or stocky trunk divided above into few or many divergent branching joints, sometimes semaphore-like: joints gray-green, usually copiously armed. 4. *O. ammophila.*

III. Ficus-indicae

Plants robust, more or less tree-like, the thick joints supported on the subterete trunk, mostly about 3 dm. long: corolla large, mostly 8–10 cm. wide: berries red or orange, said to be sometimes yellow. 5. *O. Ficus-indica.*

IV. Dillenianae

Areolae bearing 4–13 short spines which seldom exceed the bristles, the joints thus apparently unarmed: corolla short-campanulate. 6. *O. keyensis.*

Areolae bearing 2–6 long spines which much exceed the bristles, the joints thus prominently armed; or individual joints sometimes spineless: corolla rotate.

Spines decidedly flattened, often curved, in clusters of 3–6, from dense clusters of protruding bristles, the joints thus rigidly armed: plants copiously floriferous and fructiferous. 7. *O. Dillenii.*

Spines terete or nearly so, straight, solitary or 2 or 3 together, from small clusters of inconspicuous bristles, the joints not rigidly armed: plants sparingly floriferous and fructiferous. 8. *O. stricta.*

V. Elatiores

Plants large, stout, erect, but widely branched, bushy, not fragile: joints thick, but broad: hypanthium broadly turbinate: outer sepals very broad: corolla bright-yellow. 9. *O. zebrina.*

VI. Curassavicae

Plants small, prostrate, exceedingly fragile: joints narrow, often as thick as wide: hypanthium narrowly turbinate: outer sepals narrow: corolla lemon-yellow. 10. *O. Drummondii.*

VII. Brasilienses

Plants tree-like, the trunk and branchlets strikingly different: young spines pale yellow with brown tips; mature spines gray with brown tipe; berries subglobose to oval. 11. *O. brasiliensis.*

1. **Opuntia lata** Small, sp. nov.

Plant prostrate, often radially branched, sometimes forming mats nearly a meter in width, the tip of the branches sometimes assurgent, with elongate cord-like roots: joints elliptic to narrowly obovate, often narrowly so, thick, 0.4–1.5 dm. long, deep-green, sometimes glaucous, especially when young: leaves subulate, 6–11 mm. long, green or purple-tinged: areolae scattered, often conspicuous, sometimes very prominent and densely bristly, the marginal ones, at least, armed: spines slender, solitary or 2 together, pink, turning red or red-banded, at maturity gray or nearly white, nearly terete, slightly spirally twisted: flowers usually several on a joint, conspicuous: sepals subulate to lanceolate, acute: corolla yellow, 7–9 cm. wide; petals numerous, the inner ones broadly obovate to flabellate, erose at the broad minutely mucronate apex: berries clavate, 5–6.5 cm. long, red or red-purple, many-seeded: seeds about 5 mm. in diameter.

Pinelands, northern peninsular Florida.—Type specimens collected twelves miles west of Gainesville, Florida, December, 1917, J. K. Small, in the herbarium of the New York Botanical Garden. Living specimens of the same collection are in the garden at Buena Vista and in the conservatories of the New York Botanical Garden.

The discovery of this plant was recorded by me about a year ago.[1] Since that time the specimens I transplanted from Gainesville to Buena Vista have grown and assumed the habit of the plants in their native habitat. In addition they have flowered freely and fruited. The specimens I brought to the New York Botanical Garden also flowered; but naturally they did not grow to any extent under the necessarily artificial conditions under glass.

Information received from the region where *Opuntia lata* grows naturally, in addition to the personal observations of the writer, indicates that the plants always grow prostrate, just as the writer found them in the winter of 1917. The early joints may either give rise to branches that spread radially and thus form mats, or they may branch more in one direction, thus giving rise to a long string of joints with only a few lateral branches. *Opuntia lata* somewhat resembles *O. Pollardi* in habit; but it differs

[1] Journal of the New York Botanical Garden **19**: 74. 1918.

in the usually smaller joints, the long narrow hypanthium, the more numerous petals, and the clavate berries.

2. Opuntia Pollardi Britton & Rose, Smithsonian Misc. Coll. 50: 523. 1908

Plant prostrate, forming irregular mats, somewhat tuberous: joints suborbicular or oval, varying to broadly obovate, usually quite thick, 10–15 cm. long, or sometimes smaller, deep-green: areolae rather conspicuous, much scattered, some of the upper ones, at least, usually armed: spines stout, at maturity gray, usually solitary: flowers solitary or few on a joint: sepals deltoid to broadly rhombic or rhombic-cuneate, acute or mucronate: corolla light yellow, 6–7 cm. long; petals cuneate, broadly truncate and decidedly erose at the apex: berries obovoid, 2.5–3 cm. long, purple, rather many-seeded: seeds 5–6 mm. in diameter.

Pinelands and sand-dunes, coastal plain, North Carolina to northern Florida and Mississippi.

At the time of the publication of the second edition of my Flora[1] this plant was known only from southern Mississippi, where it was originally collected nearly twenty years earlier. In the spring of 1917, while in search of the long-neglected *Opuntia Drummondii*, the writer found this species widely distributed in the region north of Apalachicola, and last December he collected it on the hills back of Pensacola. As far as we know now, its range in Florida is confined to the northern part of the state, or, in other words, the coastal plain of the Gulf of Mexico. Recent exploration also brought it to light on the Atlantic coast. While searching for long-lost prickly-pears in the vicinity of Charleston,[2] South Carolina, in the winter of 1916, I found *Opuntia Pollardi* at several localities in that region, while last fall Mr. W. E. McAtee extended its known range still further northward by collecting specimens on Church's Island, in Currituck Sound, North Carolina.

As will be noticed, by comparing the geographic range of this species with that of *Opuntia Drummondii*, that the distribution of the two species coincides very closely. Last year Professor S. M. Tracy sent specimens of *Opuntia Pollardi*, collected at the

[1] Flora of the Southeastern United States, Ed. 2. 817. 1913.

[2] Journal of the New York Botanical Garden 18: 237–246. 1917.

type locality, to the garden at Buena Vista where they are now growing vigorously.

The present species and *Opuntia lata* represent the only kinds in our range with prostrate stems and branches, except the distantly related *Opuntia Drummondii*. *Opuntia Pollardi* is evidently the *Opuntia vulgaris* of Chapman's "Flora" as far as Florida is concerned.

3. Opuntia austrina Small, Fl. SE. U. S. 816. 1903

Plant erect, 1 m. tall or less, irregularly branched, tuberous: joints obovate, or nearly elliptic, thinnish, 5--10 cm. long or rarely longer, or much larger in maritime regions, deep-green or bright-green: leaves stout-subulate, 3–7 mm. long, green or purple-tinged: areolae rather prominent, the marginal and upper ones usually armed: spines slender yellowish or reddish, at maturity white or light gray, solitary or 2 together: sepals lanceolate to ovate or rhombic-ovate, acute: corolla 6–7 cm. broad, light-yellow, or sometimes very pale: petals cuneate to obovate, rounded-truncate and mucronate: berries narrowly obovoid or sometimes broadly so, 3–4 cm. long, purple: seeds numerous, 4.5–5 mm. in diameter.

Pinelands and coastal sand-dunes, northern peninsular Florida from the central part to the Atlantic, southward to Cape Sable.

As it is now understood, *Opuntia austrina* represents one of the more widely distributed prickly-pears of Florida. The geographic range seems to extend from the upper part of the lake region eastward to the flatwoods and the eastern coast strip thence southward through the Miami limestone region and Cape Sable. Certain forms from the coastal strip and from the northern part of the range do not agree in full with those from the Miami region, where the species was first described. However, the variations observed may be due to different environments and local conditions, and thus be only superficial. Striking changes in different plants of the same species, caused by somewhat abnormal and slightly disturbed environments, have been observed by the writer, both in continental and insular Florida.

In order to get a better understanding of this species, we have brought together in the plantation at Buena Vista, the various forms now referred to *Opuntia austrina* so that they may be observed as they grow under uniform conditions.

In the cactus plantation at Buena Vista, Florida, May 24, 1918.—*Opuntia keyensis* grown from joints brought from Key Largo about a year previous. Notice the large areolae or clusters of bristles in the joints with no apparent spines. However, this is our most copiously armed prickly-pear. Each areola bears a cluster of from three to thirteen short spines which seldom protrude beyond the bristles. This species differs from all other Florida prickly-pears in its campanulate corolla. Unlike its relative, *O. Dillenii*, the most abundantly fruited species in the state, this is very sparingly fruited.

This was the plant which first aroused my interest in the prickly-pears of Florida, and one of the more striking characters it exhibited was the numerous tuberous roots. For some time it was thought that this character was peculiar to *Opuntia austrina*, but later investigations have shown that *Opuntia Pollardi*, *O. ammophila*, and *O. Drummondi* produce tuberous roots; but none of them to the extent that the species under consideration does.

Opuntia austrina is a short-lived plant. Every year or two the individual plants break down and new ones start afresh either from the tuberous roots or from the old joints. It may be that there is some relation between the fibrous and tuberous rooted species and longevity. At any rate, the plants with fibrous roots seem to be longer lived as individuals than those with tuberous roots.

4. **Opuntia ammophila** Small, sp. nov.

Plant erect, more or less branched throughout or ultimately with a stem 1–2 m. tall or more, becoming 1–2.5 dm. in diameter, bearing several spreading branches near the top, thus tree-like, tuberous at the base: joints various, those of the main stem elongate, ultimately fused on the ends and subcylindric, those of the branches typically obovate or cuneate, varying to elliptic or oval, thickish, 0.5–1.7 dm. long, becoming gray-green: leaves stout-subulate, 6–10 mm. long, green: areolae relatively numerous, conspicuous on account of the densely crowded long bristles, especially on the older joints, the marginal ones, at least, armed: spines very slender, solitary or 2 together, reddish or red, at maturity gray, mostly 2–6 cm. long, nearly terete, scarcely spirally twisted: flowers several on a joint: sepals lanceolate, acute or slightly acuminate: buds sharply pointed: corolla bright-yellow, 5–8 cm. wide; petals cuneate or obovate, notched and prominently apiculate, scarcely erose: stigmas cream-colored: berries obovoid, 2–3 cm. long, more or less flushed with red-purple, many-seeded: seeds about 4 mm. in diameter. [Plate 224.]

Inland sand-dunes (scrub), peninsular Florida.—Type specimens from south of Ft. Pierce, collected in December, 1917, by J. K. Small. They are in the herbarium of the New York Botanical Garden. Living plants are also in the conservatories of the Garden, as well as in the plantation at Buena Vista, Florida.

My attention was first attracted to this species on the large sand-dunes south of Fort Pierce, in a region that has turned out to be the southern end of its geographic range. It reaches its best development, however, in the northern part of its range west of Lake George. It differs from all our other species in the gray-green color, the numerous elongate, very slender, often deflexed, spines, and in the small, thick-obovoid fruits. In spite of its vicious armament, the cattle that range through the country west of Lake George often browse upon it.

This plant is the most conspicuous native prickly-pear in Florida, and curiously enough, in proportion to its striking habit, the most neglected one. It is confined to the so-called "scrub" or inland quiescent sand-dunes which range in a general way through the lake region and the east Florida flat-woods, from the region west of Lake George to that east of Lake Okeechobee.

The first definite record of *Opuntia* in Florida begins with the record of the discovery of a large prickly-pear about the western shores of Lake George by William Bartram in the latter part of the eighteenth century.[1] His account of the plant he observed suggests a form with the habit of *Opuntia Ficus-indica;* but this species could not have been established there at that early date, and, further, he describes the berries as purple and charged with juice. One could imagine that he found a plant or a colony of the plant just described; but its fruits are conspicuously small, at least relatively so in proportion to the size of the plant, and they are not particularly juicy, in fact they are rather dry.

The writer recently visited the country west of Lake George, traveling many miles through it for the purpose of rediscovering the Bartram plant, but without success. If Bartram did find a particularly smooth and large-fruited prickly-pear, such as he describes, the cattle may have exterminated it by this time. Thus the Bartram *Opuntia* still remains a mystery.

[1] Travels through North and South Carolina, Georgia, East and West Florida 161.

5. Opuntia Ficus-indica (L.) Mill. Gard. Dict. Ed. 8. Opuntia. No. 2. 1768

Cactus Ficus-indica L. Sp. Pl. 468. 1753.

Plant erect, often tree-like, 4 m. tall or less, the early joints somewhat fusing to form a thick trunk which supports irregularly spreading heavy branches: joints elliptic, varying to slightly broadest above the middle or below it, very thick, mostly 3–4 dm. long, often slightly glaucous: areolae small, with yellowish bristles and white wool: spines wanting, or occasionally and irregularly developed, and mostly solitary, pale, at maturity turning white, nearly terete: flowers usually several on a joint: corolla yellow, 7–10 cm. wide: berries obovoid, red or orange (said to be sometimes yellow), 5–9 cm. long: seeds 3.5–4.5 mm. in diameter.

Waste places, roadsides, and old fields, Florida. Doubtless native of tropical America; but its original home is unknown. Naturalized in the Old World.

Two of the species of *Opuntia* now growing naturally in Florida are naturalized exotics. The present plant is apparently a rather recent introduction. The *Opuntia Ficus-indica* of the older floras is evidently based on specimens of the species following the one here described.

The species is apparently represented in several forms. In some places it has escaped from flower-gardens, while in other regions it may be found on roadsides, in fence-corners, and in old fields where it formerly was planted extensively by people who are locally known as "cactus-crazy." This plant does not seem to be of much practical use at present.

6. **Opuntia keyensis** Britton, sp. nov.

Plant erect, much-branched, sometimes forming clumps 3 m. tall, with long fibrous roots: joints elliptic, oval, obovate or spatulate, thick, 1–3 dm. long, bright-green: leaves ovoid, 2–3 mm. long, green: areolae rather conspicuous, often relatively large and prominent, apparently unarmed: spines stout, 4–13 together, very short, mostly hidden in the bristles, pink, at maturity salmon-colored, and sometimes protruding from the areolae as tufts of very coarse bristles, slightly flattened: buds short-pointed: flowers solitary or 2 or 3 on a joint: sepals deltoid to subreniform, acute or acutish: corolla salmon-colored, cup-like or short-campanulate, 3–3.5 cm. wide; petals rather few,

the inner ones broadly obovate or orbicular-obovate, undulate, scarcely, if at all, mucronate: berries obovoid, 4–6 cm. long, purple: seeds numerous. [Plate 225.]

Hammocks, Florida Keys and the Cape Sable region.—Type specimens collected on Boot Key, April, 1909, by N. L. Britton in the herbarium of the New York Botanical Garden.

Our two typically maritime species of *Opuntia* were recorded for many years under names that did not belong to them, as far as the plants growing in Florida were concerned.

This plant is strictly maritime, and has only been found on the Florida Keys and on the shores of the Cape Sable region It has been confused with several species described long ago, but recent observation both in the field and on plants grown in the garden at Buena Vista have convinced me of its valid claim to specific recognition. It differs from its relative, *Opuntia Dillenii*, both in vegetative and floral characters. Casual observation would determine it as unarmed; but careful examination will disclose it to be in a way our most thoroughly armed kind. The spines are short and stout, so short that they seldom protrude beyond the bristles of the areolae. However, they are often numerous and exist in clusters of as many as thirteen. The flower is unique among the Florida species of *Opuntia*. The corolla instead of being rotate is short-campanulate or cup-shaped. The plants produce flowers and fruits much more sparingly than those of *Opuntia Dillenii*.

This species is evidently the *Opuntia Ficus-indica* of Chapman's "Flora," and it was described under *Opuntia inermis* in the second edition of my "Flora."

7. Opuntia Dillenii (Ker) Haw. Suppl. Pl. Succ. 79. 1819

Cactus Dillenii Ker, Bot. Reg. 3: under *pl.* 255. 1818.

Plant erect, rather strict, sparingly branched and much-branched and sometimes diffuse or sometimes 2 m. tall, occasionally somewhat tree-like, with stout fibrous roots: joints elliptic to obovate or oval, thickish, 1–3 dm. long, light-green, often glaucous: leaves ovoid, 2–5 mm. long, usually green: areolae remote but conspicuous, mostly armed: spines stoutish, clustered, usually 3–6 together, flattened, often curved, pale-

yellow, at maturity deeper yellow and often sordid: flowers several on a joint: corolla yellow, salmon, or reddish, rotate, 6–8 cm. wide; petals rather few, the inner broadly cuneate to broadly obovate, often mucronate: berries pyriform, 5–6 cm. long, purple: seeds numerous, 3–4 mm. in diameter.

Hammocks along or near the coast, and sand-dunes, peninsular Florida and the Florida Keys. Bermuda, West Indies, and eastern Mexico.

During the earlier period of Florida botany, *Opuntia Dillenii* was referred to under the specific names of plants to which it is really only distantly related. In fact its identity was not definitely established until the beginning of the present century.

This species is the common and typically maritime prickly-pear of our range, and also the most vigorous of the several different kinds. It is apparently the longest-lived and the healthiest of them all, seemingly wholly free from disease and also from insect pests. It grows either in perpetual shade or in exposed sunny localities and will stand almost any amount of ill-treatment and frequent transplanting for ornamental purpose with impunity.

Although typically maritime and sometimes growing even in mangrove swamps or in low situations where the plants are partly submerged during high tide, it may be found equally vigorous on the high quiescent sand-dunes along the eastern coast of the Florida peninsula.

In addition to producing the strongest and most thorough armament of our species, it is the most prolific in the matter of flowers and fruits. Plants or clumps of plants are often conspicuous on account of large quantities of purple fruits, which are never equalled in numbers in the case of any of our other species. It is the *Opuntia polyantha*, at least in part, of Chapman's "Flora."

8. OPUNTIA STRICTA Haw. Syn. Pl. Succ. 191. 1812

(?) *Opuntia Bentonii* Griffiths, Rep. Mo. Bot. Gard. **22**: 25. *pl. 1 and 2.* 1912.

Plant erect, but ultimately diffusely or widely branched, mostly less than 1 m. tall, not tuberous: joints broadly spatulate,

obovate, elliptic, or oval, thinnish, or quite thick at the base of the plant, mostly 1–3 dm. long, bright-green: leaves stout-subulate, 3–9 mm. long, green or purplish-green: areolae rather evenly scattered or more numerous along the edges than on the faces of the joints, few of the upper marginal ones armed, or joints individually unarmed: spines slender, solitary, or 2 or 3 together and sometimes with several shorter ones, pale-yellow, at maturity deeper-yellow, nearly terete, obscurely spirally twisted: flowers showy, mostly few on a joint: sepals lanceolate or ovate-lanceolate: corolla 8–10 cm. wide; petals few, the inner ones broadly obovate or cuneate, some of them mucronate: berries solitary or few on a joint, obovoid, sometimes slightly pyriform, 3·5–5 cm. long, purple.

Sandy woods and roadsides Florida to eastern Texas.

For many years specimens of a prickly-pear of uncertain relationship were collected in Florida. In 1912, Dr. David Griffiths associated the specimens from northern Florida and described them undert he name of *Opuntia Bentonii*, making the type specimen a certain collection from near MacClenny, at the same time recording the extension of the geographic range to the mouth of the Brazos River in Texas.

A little later Dr. Britton and Dr. Rose, in the course of their studies in the genus *Opuntia*, associated this plant with *Opuntia stricta*, basing their opinion on the close resemblance of the Florida specimens and those of apparently authentic specimens of *O. stricta* received from European botanical gardens where that plant had long been in cultivation. Still later they began to refer here various hitherto unassigned specimens from peninsular Florida, so that now we know the species to range from the northern extremity of the state to the southern.

One curious point about this plant is that its habitats, as far as the writer has observed, often arouse suspicion that it may be naturalized in Florida, and not a native. In fact, Dr. Griffiths says:[1] "Always in cultivation in the eastern portion of this range and native in southwestern Louisiana and Texas." If the Florida specimens are properly referred to *Opuntia stricta* it is quite likely they are descendants of plants that were brought from Cuba, where it appears to be native, or from some other point

[1] Rep. Mo. Bot. Gard. **22**: 25.

in tropical America, or even from Texas, at least in some cases, as there seems to be some variation in those from different localities, for cultivating, and later escaped from gardens where it was planted.

This is, perhaps, the *Opuntia polyantha* of Chapman's "Flora" as far as the Apalachicola part of the range given for that species is concerned.

9. **Opuntia zebrina** Small, sp. nov.

Plant erect, more or less branched, throughout, fully 1 m. tall, or less, the roots fibrous: joints oval or obovate, thickish, mostly 1–2 dm. long, deep-green, sometimes obscurely glaucous: leaves ovoid, 2–3 mm. long, bright-green: areolae scattered, some of them, usually the lower ones, unarmed, the upper ones irregularly armed: spines slender, solitary or 2, 3, or 4, together, red-brown, finely banded, nearly terete, closely spirally twisted: flowers few on a joint, or solitary: sepals deltoid, to deltoid-reniform or nearly reniform: corolla yellow, rotate, 6–7 cm. wide; petals rather numerous, the inner ones broadly-obovate, undulate, minutely mucronate or notched at the apex: berries obovoid, not constricted at the base, 3.5–4.5 cm. long, red-purple: seeds many, 6–7 mm. in diameter. [Plate 226.]

Coastal sand-dunes, Cape Sable, Florida, and the lower Florida Keys.—Type specimens collected on Middle Cape Sable, December, 1917, by J. K. Small, in the herbarium of the New York Botanical Garden.

The only specimens collected on Middle Cape Sable on a cruise to that region in December, 1917, were plants of a prickly-pear. In spite of clouds of mosquitoes that almost defeated the securing of any plants at all, the writer and his associates managed to gather several bags of joints of an *Opuntia* that seemed different from others heretofore observed by us in southern Florida.

The discovery of this plant not only added a new species to our range, but also brought a series of hitherto more southern geographic range, into our limits. It is a conspicuous plant, not only on account of the contrast of its peculiarly deep-green joints and bright-yellow corollas, but also on account of its vigorous growth and continuous healthy condition. A close examination reveals an armament not duplicated in our other

species. The mature spine is very slender, red or brown, more or less banded. It consists of a very close spiral.

Since describing this species from the specimens collected by the writer on Cape Sable, a specimen collected on Boot Key, Florida, in April, 1909, by Dr. N. L. Britton, has been found in the herbarium of the New York Botanical Garden, where it was associated with another plant. In July, 1918, Dr. J. N. Rose discovered the plant on Key West, whence he sent us joints and mature fruits.

In addition to the herbarium specimens cited above, living specimens of the original collection are growing in the cactus garden at Buena Vista and in the conservatories of the New York Botanical Garden. As the plants grow at Buena Vista, they appear to last individually for at least several years, as up to the present there is no sign of the original plants breaking down.

10. OPUNTIA DRUMMONDII Graham, The Botanist 5: *pl. 246.* 1841

Opuntia frustulenta Gibbes, Proc. Ell. Soc. Nat. Hist. 1: 273. 1859.

Opuntia Pes-Corvi Le Conte; Chapm. Fl. S. St. 145. 1860.

Plant prostrate or diffusely sprawling, sometimes forming depressed mats, tuberous: joints ellipsoid, usually narrowly so, or slightly broadest above the middle or below it, very turgid, 3–12 cm. long, light-green or pale-green, loosely attached to each other: leaves ovoid, 3–6 mm. long, green: areolae inconspicuous, the upper ones, at least, armed: spines very slender, solitary or 2, 3, or 4 together, pink, reddish, or red, at maturity gray or even whitish, sometimes darker at the tip, nearly terete: flowers solitary or few on a joint: sepals lanceolate to ovate, acute or acutish: corolla lemon-yellow, 5–6 cm. wide: petals rather few, the inner ones broadly cuneate to obovate, mucronate to emarginate at the apex: berries turbinate-obovoid, 2–3.5 cm. long, purple: seeds few, about 4 mm. in diameter.

Pinewoods and sand-dunes, near the coast, North Carolina to Florida and Alabama.

The history of *Opuntia Drummondii*, together with some notes

In the cactus plantation at Buena Vista, Florida, May 24, 1918.—*Opuntia zebrina* grown from joints brought from Cape Sable in the winter of 1917. Many of the prominent areolae or clusters of bristles on the joints are armed with long red and brown striped spines and consequently do not show in the photograph. This prickly-pear has no close relatives in the United States; the related species being found in tropical America. Its red-brown spines and turbinate-obovoid fruits distinguish it from all our other species.

in its habit, has lately been recorded in considerable detail.[1] It is indeed, not strange that this plant, even considering its extensive geographical range, should have remained, until recently, the least known of the older described species of *Opuntia* in the eastern United States.

The exceedingly fragile articulation of the joints was commented on in the papers referred to above. Recent observations have shown that even the wind will separate the joints and scatter them. It may be that this ready method of vegetative propagation has caused the plant to become the shyest bloomer of all our eastern species of *Opuntia*. It may be readily seen that propagation by seeds is almost unnecessary. The crowfoot-cactus, as this plant is sometimes called, grows naturally in the loose sand of pinewoods or in the drifting sands of active dunes. In sheltered spots the branches lie on the surface of the sand; but when in exposed positions the joints naturally partly bury themselves in the sand and thus strings of joints that would otherwise be b'own apart and scattered, are securely anchored in place, at least until the sand may be blown away from the bodies of the joints and from the spines which extend further down into the sand. The phenomena just described not only obtain in the natural habitats of this plant, but they are duplicated on the sand mounds in the cactus plantation at Buena Vista.

Another interesting point in connection with this plant recently impressed on the writer is the similarity in color between the joints and spines on the one hand and the sand in which they grow on the other. The camouflage is usually so complete that one usually feels the presence of the plants before the eye is attracted by them.

The color of the corolla according to both the original plate and to testimony obtained at Apalachicola is lemon-yellow. Dr. Mohr records the corolla as being "rose purplish." The color is various in some species of *Opuntia*, and it may thus vary in this one.

[1] Journal of the New York Botanical Garden **18**: 237–246. 1917. and **19**: 1–6. 1918.

11. OPUNTIA BRASILIENSIS (Willd.) Haw. Suppl. Pl. Succ. 79. 1819

Cactus brasiliensis Willd. Enum. Suppl. 33. 1813.

Plant erect, tree-like, 5 m. tall or more, or often much smaller, with a terete upwardly tapering trunk which in mature plants supports terete spreading branches, these in turn divided into branching flat oblong, elliptic, or obovate relatively thin leaf-like, bright-green joints: leaves ovoid, mostly 1–3 mm. long, light-green: areolae small, minutely white-woolly, those of the stem, branches, and edges of the joints armed: spines slender, usually solitary, terete, mostly 1–3 cm. long, pale with reddish or brown tips, ultimately gray: flowers usually several on the terminal joints: sepals ovate, the inner ones broadly so: corolla lemon-yellow, mostly 3–4 cm. wide: berries subglobose to oval, 2.5–4 cm. long, light yellow, the areolae conspicuous on account of the tufted brown bristles.

Woods, eastern peninsular Florida. Native of eastern South America.

Among the eleven species of *Opuntia* growing naturally in Florida, only two are introduced and naturalized plants. The present species, although sometimes seen in and about gardens, has not been definitely determined as a naturalized plant until quite recently. However, like many other cultivated exotics, it may be more extensively naturalized than we now know. Last November, John Soar and Charles T. Simpson collected specimens of *Opuntia brasiliensis* on a shell mound south of Daytona, Florida. Although there is no habitation near the spot, at present, I have been informed that there is evidence that long ago a house and garden may have stood there. This would account for the occurrence of this prickly-pear now growing on the shell mound.

To sum up: We definitely know eleven species of prickly-pears growing naturally in Florida, nine native kinds (*Opuntia lata, O. Pollardi, O. austrina, O. ammophila, O. keyensis, O. Dillenii, O. stricta, O. zebrina, O. Drummondii*), and two naturalized exotics, (*Opuntia Ficus-indica, O. brasiliensis*). Six of the native species are endemic (*Opuntia lata, O. austrina, O. ammophila, O. keyensis, O. zebrina*), three are found in other states (*Opuntia*

Pollardi, *O. stricta*, *O. Drummondii*), while one species (*Opuntia Dillenii*) is widely distributed in tropical America. Two species (*Opuntia lata*, *O. Pollardi*) are typical of inland pinelands. One species (*Opuntia ammophila*) is confined to the ancient quiescent sand-dunes or scrub, and the adjacent prairies and pinelands, while two species (*Opuntia austrina*, *O. Drummondii*) occur on the active sand-dunes and in the inland pinelands. Three species (*Opuntia keyensis*, *O. Dillenii*, *O. zebrina*) are typically maritime and grow almost always in hammocks or on coastal dunes near hammocks.

Among the native species three (*Opuntia lata*, *O. Pollardi*, *O. Drummondii*) are prostrate, while six (*Opuntia austrina*, *O. ammophila*, *O. Keyensis*, *O. Dillenii*, *O. stricta*, *O. zebrina*) are erect, some of them merely bushy, others tree-like.

JOHN K. SMALL.

DR. HENRY ALLAN GLEASON APPOINTED FIRST ASSISTANT

Dr. Henry Allan Gleason has been appointed the First Assistant of the Director-in-Chief, succeeding Dr. W. A. Murrill, who has been transferred to the new position of Supervisor of Public Instruction.

Dr. Gleason is 37 years old; he was graduated from the University of Illinois in 1901, received his Master of Arts degree from his alma mater in 1904, and his degree of Doctor of Philosophy from Columbia University in 1906. He studied at the New York Botanical Garden in 1905, 1906, 1913, and again in 1918, and at the Missouri Botanical Garden in 1904. From 1901 until 1910 he served as assistant and later as instructor in the botanical department of the University of Illinois, except during one year, while he was a fellow of the Ohio State University. Since 1910 he has been on the faculty of the University of Michigan, first as Assistant Professor of Botany, and later as Associate Professor, and since 1915 he has been Director of the Botanical Garden and Arboretum of that institution. Dr. Gleason's

special interest in plant life are ecology and geographic distribution; his published papers include over 40 titles. He has traveled widely in the United States, and in 1913–14 made an Asiatic trip for the purpose of studying at the Dutch Botanical Garden at Buitenzorg, Java. Dr. Gleason is married and has two children.

N. L. BRITTON,
Director-in-Chief

THE USE OF PLANTS IN DECORATIVE DESIGN

In their desire to be of service to designers and students of design, the New York Botanical Garden and the Metropolitan Museum have devised a new field for their joint efforts in a projected exhibition to be held in Class Room B of the Museum from March 15 to April 20. This will display designs in which plant motives are used, selected from the Museum collections, and living plants themselves, provided by the Botanical Garden.

Plant life has been a source of inspiration to designers since prehistoric times. A few typical plants have been used throughout the whole history of design. This fact the exhibition will take into account and will group about those chief motives examples of design dating from different periods and in various materials.

The exhibition will not, however, be exclusively historical but will include a group of plants not yet used to any appreciable extent as decorative motives but admirably adapted to design. Our native flora, in fact, offers to the modern designer, who often has followed the traditions of the European schools, an almost unexplored but invitingly attractive field.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Kraunhia macrostachya. LONG-CLUSTERED WISTERIA.
Location: Viticetum.
Natural distribution: South central United States.

Kraunhia sinensis. CHINESE WISTERIA.
Location: Viticetum.
Natural distribution: China.

Robinia. LOCUST

Robinia hispida. ROSE ACACIA.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Robinia Kelseyi. KELSEY'S ROSE ACACIA.
Location: Fruticetum.
Natural distribution: Southern Alleghany Mountains.

Robinia neo-mexicana. NEW MEXICAN LOCUST.
Location: Fruticetum.
Natural distribution: Southwestern United States.

Robinia Pseudacacia. LOCUST-TREE.
Location: Arboretum.
Natural distribution: South central United States.

Robinia Pseudacacia var. **Decaisneana.** ROSE-FLOWERED LOCUST-TREE.
Location: Arboretum.

Robinia Pseudacacia var. **inermis.** SPINELESS LOCUST-TREE.
Location: Fruticetum.

Robinia Pseudacacia var. **Rehderi.** DWARF LOCUST-TREE.
Location: Fruticetum.

Robinia viscosa. CLAMMY LOCUST.
Location: Fruticetum. Arboretum.
Natural distribution: Virginia to Georgia.

Colutea. BLADDER SENNA

Colutea arborescens. TALL BLADDER SENNA.
Location: Fruticetum.
Natural distribution: Southern Europe and northern Africa.

Colutea orientalis. ORIENTAL BLADDER SENNA.
Location: Fruticetum.
Natural distribution: Southeastern Europe and the Orient.

Halimodendron. SALT TREE

Halimodendron halodendron. SALT TREE.
Location: Fruticetum.
Natural distribution: Central Asia.

Caragana. PEA-TREE

Caragana Caragana. COMMON PEA-TREE.
Location: Fruticetum.
Natural distribution: Siberia and Manchuria.
Caragana Chamlagu. CHAMLAGU PEA-TREE.
Location: Fruticetum.
Natural distribution: Northern China.
Caragana frutex. CHINESE PEA-TREE.
Location: Fruticetum.
Natural distribution: Southern Russia to China.
Caragana microphylla. SMALL-LEAVED PEA-TREE.
Location: Fruticetum.
Natural distribution: Siberia and China.
Caragana pygmaea. PIGMY PEA-TREE.
Location: Fruticetum.
Natural distribution: Caucasus to Siberia and Thibet.

Coronilla. CORONILLA

Coronilla Emerus. SCORPION SENNA.
Location: Fruticetum.
Natural distribution: Southern Europe.

Lespedeza. BUSH-CLOVER

Lespedeza bicolor. JAPANESE BUSH-CLOVER.
Location: Fruticetum.
Natural distribution: Amur Region, northern China and Japan

Peuraria. KUDZU VINE

Pueraria hirsuta (*Pueraria Thunbergiana*). KUDZU VINE.
Location: Viticetum.
Natural distribution: Japan.

RUTACEAE. Rue Family

Zanthoxylum. PRICKLY ASH

Zanthoxylum americanum. PRICKLY ASH.
Location: Fruticetum. Economic Garden.
Natural distribution: Northeastern United States.
Zanthoxylum Bungei. BUNGE'S PRICKLY ASH.
Location: Fruticetum.
Natural distribution: Northern and central China.
Zanthoxylum micranthum. SMALL-FLOWERED PRICKLY ASH.
Location: Fruticetum. Arboretum.
Natural distribution: China.
Zanthoxylum schinifolium. JAPANESE PRICKLY ASH.
Location: Fruticetum.
Natural distribution: Japan and Corea.

Ptelea. HOP TREE

Ptelea trifoliata. HOP TREE.
Location: Fruticetum.
Natural distribution: Eastern United States.
Ptelea trifoliata var. **aurea.** GOLDEN HOP TREE.
Location: Fruticetum.
Ptelea trifoliata var. **mollis.** HAIRY HOP TREE.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Phellodendron. CORK TREE

Phellodendron amurense. AMOOR CORK TREE.
Location: Arboretum.
Natural distribution: Northern China, Amurland, and Japan.
Phellodendron japonicum. JAPANESE CORK TREE.
Location: Arboretum.
Natural distribution: Central Japan.

Phellodendron sachalinense. SACHALIN CORK TREE.

Location: Arboretum. Along walk, Museum to 200th Street entrance.

Natural distribution: Saghalin, Corea, northern Japan, and western China.

Poncirus. TRIFOLIATE ORANGE

Poncirus trifoliata. TRIFOLIATE ORANGE.

Location: Fruticetum.

Natural distribution: Northern China.

SIMARUBACEAE. Ailanthus Family

Ailanthus. TREE-OF-HEAVEN

Ailanthus glandulosa. TREE-OF-HEAVEN.

Location: Arboretum. 200th Street entrance.

Natural distribution: China.

MELIACEAE. Mahogany Family

Toona. BASTARD CEDAR

Toona sinensis. CHINESE BASTARD CEDAR.

Location: Arboretum.

Natural distribution: Northern China.

BUXACEAE. Box Family

Buxus. Box

Buxus japonica. JAPANESE BOX.

Location: Fruticetum.

Natural distribution: China and Japan.

Buxus microphylla. SMALL-LEAVED BOX.

Location: Fruticetum.

Natural distribution: Japan.

Buxus sempervirens. COMMON BOX TREE.

Location: Fruticetum.

Natural distribution: Europe and Asia.

Buxus sempervirens var. **angustifolia.** NARROW-LEAVED BOX.

Location: Fruticetum.

Buxus sempervirens var. **angustifolia aurea.** GOLDEN NARROW-LEAVED. BOX.
Location: Fruticetum.

Buxus sempervirens var. **aurea.** GOLDEN BOX.
Location: Fruticetum.

Buxus sempervirens var. **Handsworthii.** HANDSWORTH'S BOX.
Location: Fruticetum.

Buxus sempervirens var. **macrophylla.** LARGE-LEAVED BOX.
Location: Fruticetum.

Buxus sempervirens var. **navicularis.** CHANNEL-LEAVED BOX.
Location: Fruticetum.

Buxus sempervirens var. **rotundifolia.** ROUND-LEAVED BOX.
Location: Fruticetum.

NOTES, NEWS AND COMMENT

Thrushes were well represented in the Garden during 1918. Most of the species, including two Bicknell thrushes, were seen. The wood duck, mother of two in 1917, had a family of nine last year and all survived. A rose-breasted grosbeak remained through the season and two chats were seen in migration. A merganser was a novelty.—F. H. HOUGHTON.

Mr. Ivan M. Johnston has recently sent to the Garden herbarium a large and valuable collection containing over 100 numbers of woody and fleshy fungi, collected in the mountains about Claremont, California. The collection is accompanied by valuable field notes and sketches. Several species that have been known very imperfectly are represented by a number of good specimens in this collection.

Mr. John H. Slocombe, originator of some of the most desirable varieties of dahlias now in cultivation, died in New Haven, Connecticut, on January 11, in his seventy-fifth year. Last

spring he generously contributed roots of thirty-eight choice varieties to the new dahlia border of the Garden, as acknowledged in the JOURNAL for August, 1918.

On January 22, 300 pupils from Evander Childs High School visited the Garden to study living tropical plants, hardy trees, and plant products. They were in charge of Mr. Mann and some of his teachers, assisted by several members of the Garden staff. Mr. Hewitt gave an interesting illustrated lecture on forestry in the large lecture hall in the museum building. The weather was mild and the work of the pupils very satisfactory.

A persistent search was made by Dr. A. H. Graves in the vicinity of New York City during the growing season of 1918 for chestnut trees that had escaped the ravages of the chestnut canker, but no immune trees were found. However, a number of trees were located, which, according to Dr. Graves, give promise of highly resistant strains through inbreeding and crossing with resistant oriental species.

Last summer, Mr. Eckstein Case presented to the Garden a series of water-color paintings made by his sister, Miss Mary Case, late of Cleveland, Ohio. These are on 225 loose sheets and illustrate about 425 species of native American wild flowers from various parts of the United States, and two from the Giant's Causeway, Ireland. Flowers and fruits of many of the species are figured, illustrating some very rare and interesting plants. These have been placed in two albums, and deposited in the library. Besides these, Miss Case's copy of Mrs. Dana's "How to know the Wild Flowers" was also presented. It is beautifully hand-colored with 383 illustrations, evidently done from living plants.

The unusually mild winter has permitted much work on the grounds, which in ordinary winter seasons would have been im-

possible. By the aid of subscriptions by members of the Corporation and of the Women's Auxiliary, we are giving needed employment to laborers engaged in necessary rock excavation at conservatory range 2 and near the museum building, thus obtaining stone for the Telford foundations of paths through the magnolia, oak and birch collections in the arboretum, and through the site of the war memorial grove of Douglas spruce to be planted in the spring, described in the January issue of the *Journal*. Much earth excavation and grading along these new paths has also been accomplished. These new paths, which were much needed, are 10 feet wide and, collectively, over 1600 feet in length. They are now being surfaced with fine ashes from the power house.

Meteorology for January.—The total precipitation for January was 3.21 inches, including a very light fall of snow (about 0.50 inches snow measurement) on the 8th and 9th. The maximum temperatures recorded at the Garden for each week were *60° on the 2d*, 42° on the 8th, 50° on the 16th, 51° on the 26th and 52° on the 27th. The minimum temperatures were 13° on the 5th, *7° on the 12th*, 23° on the 20th, 25° on the 25th and 29° on the 28th.

ACCESSIONS

MUSEUMS AND HERBARIUM

1 specimen of *Gymnopus velutipes* from Michigan. (By exchange with Mrs. Wallis Craig Smith.)

25 specimens, "Fungi Utahensis"; fascicle 10. (Distributed by Professor A. O. Garrett.)

1 specimen of *Hymenogaster* from South Carolina. (By exchange with Professor Guy West Wilson.)

1 specimen of *Entoloma strictum* from Massachusetts. (By exchange with Mr. Simon Davis.)

200 specimens, "North American Uredinales," Centuries 20 and 21. (Distributed by Mr. Elam Bartholomew.)

2 specimens of fungi from Porto Rico. (By exchange with Professor F. S. Earle.)

1 specimen of *Aleurodiscus Oakesii* from Montana. (Collected by Mr. R. S. Williams.)

LIBRARY ACCESSIONS FROM NOVEMBER 1, 1918, TO JANUARY 31, 1919

American rose annual. Vol. 2. Ed. 2., Vol. 3. Harrisburg, 1917, 1918.

COSTANTIN, JULIEN NÖEL. *Les Mucedinées simples.* Paris, 1888.

DIXON, ROYAL, & FITCH, FRANKLIN EVERETT. *The human side of trees.* New York, 1917. (Given by Mrs. N. L. Britton.)

FERRY DE LA BELLONE, CAMILLE DE. *La truffe.* Paris, 1888.

GERTH VAN WIJK, H. L. *A dictionary of plant-names.* Vol. 2. The Hague, 1916.

HARDING, ALICE. *The book of the peony.* Philadelphia, 1917. (Given by Mrs. N. L. Britton.)

KELLY, HOWARD ATWOOD. *Some American medical botanists commemorated in our botanical nomenclature.* Troy, 1914. (Given by Dr. J. H. Barnhart.)

LETELLIER, JEAN BAPTISTE LOUIS. *Figures des champignons servant de supplément aux planches de Bulliard.* Ed. 2. Meilhac [1841].

LOVELL, JOHN H. *The flower and the bee.* New York, 1918. (Given by Mrs. N. L. Britton.)

MICHAEL, EDMUND. *Führer für Pilzfreunde.* 3 vols. Zwickhau i. S. 1898–1905.

MURRILL, WILLIAM ALPHONSO. *Three young Crusoes.* Bronxwood Park, 1918. (Given by Dr. W. A. Murrill.)

NYLANDER, WILLIAM. *Observationes circa Pezizas Fenniae.* [Helsingfors, 1869.]

OLIVER, GEORGE W. *Plant culture.* Ed. 3. New York, 1912. (Given by Mrs. N. L. Britton.)

ROMELL, LARS GUNNAR. *Dr. M. A. Lindblads swampbok.* Stockholm, 1902.

TRATTINNICK, LEOPOLD. *Fungi austriaci, iconibus illustrati.* Wien, 1805–[06].

TRELEASE, WILLIAM. *Winter botany.* Urbana, 1918. (Given by Mrs. N. L. Britton.)

WUNSCHE, FRIEDRICH OTTO. *Flore générale des champignons.* Paris, 1883.

PLANTS AND SEEDS

1 plant of *Juglans cordiformis.* (Given by Mr. J. F. Jones.)

5 plants of *Erica.* (By exchange with Harvard Botanic Garden.)

235 plants for herbaceous collections. (Collected by Mr. E. B. Southwick.)

32 orchids for conservatories. (Given by Mrs. Henry Marquand.)

5 plants of *Rhipsalis.* (By exchange with Bureau of Plant Industry.)

5 plants of *Hylocereus.* (Given by Mr. G. A. Lind.)

3 plants of *Cereus.* (Given by Mr. W. H. Becker.)

2 orchid plants. (By exchange with Lager & Hurrell.)

5 plants for conservatories. (Given by Mrs. J. B. Trevor.)

4 plants of *Lantana Camara.* (Given by Mrs. C. D. Dickey.)

25 plants, mostly palms, for the conservatories. (Given by Mrs. Finley J. Shepard.)

1 plant of *Mamillaria* from New Mexico. (Given by Mr. W. H. Long.)

2 plants of *Opuntia Stanleyi.* (By exchange with Dr. D. T. MacDougal.)

6 plants of *Mesembryanthemum* from California. (Given by Dr. H. M. Richards.)

2 plants of *Cattleya Trianae.* (Given by Mr. Adam Muller.)

1 plant of *Strobilanthus Dyerianus.* (By exchange with Mr. S. Untermyer.)

198 plants for conservatories from Ecuador. (Collected by Dr. J. N. Rose.)

43 plants for herbaceous grounds. (Collected by Dr. F. W. Pennell.)

2 plants of *Peperomia* from Florida. (Collected by Dr. J. K. Small.)

21 plants for conservatories from Florida. (Collected by Dr. J. K. Small.)

2 orchid plants for conservatories from Florida. (Collected by Dr. J. K. Small.)

16 plants for conservatories. (By exchange with U. S. National Museum, through Dr. J. N. Rose.)

1 plant of *Agave decipiens* from Key West, Fla. (Collected by Dr. J. N. Rose.)

205 plants derived from seeds from various sources.

2 packets of seeds of *Ochroma.* (Given by Mr. W. W. Rowlee.)

2 packets of oak seed. (By exchange with Indiana Board of Forestry Service.)

144 packets of seeds from Colombia. (Collected by Dr. F. W. Pennell.)

1 packet of seed of *Ochroma tomentosa* from Colombia. (Collected by Rusby & Pennell.)

15 packets of seeds from Colombia. (By exchange with Ministerio de Agric. y Comercie, through Mr. M. T. Dawe.)

2 packets of seed of *Ilex verticillata.* (Given by Mrs. N. L. Britton.)

1 packet of seed of *Picrodendron baccatum.* (Given by Mr. Wm. Harris.)

14 packets of seed. (By exchange with Hort. Sect. Ministry of Agric., Giza, Egypt.)

2 packets of seed. (Given by Mrs. W. W. Heaton.)

2 packets of *Robinia* seed. (Given by Mr. H. G. Wolfgang, through Dr. J. K. Small.)

5 packets of seed of *Quercus virginiana.* (Collected by Dr. J. K. Small.)

1 packet of seed of *Arisaema* sp. from Florida. (Collected by Dr. J. K. Small.)

1 packet of Florida seed. (Collected by Dr. J. K. Small.)

1 packet of *Opuntia* seed from North Carolina. (Given by Mr. W. L. McAtee.)

1 packet of seed of *Paurotis Wrightii.* (Given by Mr. C. A. Mosier.)

4 packets of Cuban seed. (Given by Bro. Leon.)

2 packets of seed. (By exchange with Bureau of Plant Industry.)

1 packet of *Solanum* seed. (Given by H. J. Corfield.)

1 packet of seed of *Sparganium acaule.* (Collected by Mr. P. Wilson.)

1 packet of seed of *Coffea arabica.* (Given by Dr. H. H. Rusby.)

1 packet of *Sapindus* seed from Colombia. (Collected by Dr. H. H. Rusby.)

Conservatory Range No. 1, and Flower Gardens

JOURNAL

OF

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VOL. XX March, 1919 No. 231

INSTRUCTION IN GARDENING FOR CONVALESCENT SOLDIERS AND SAILORS

(WITH PLATES 227, 228 AND 229)

At a meeting of the Executive Committee of the Board of Managers held October 3, 1918, the president was authorized to offer the facilities of the Garden to the United States Government for instruction of convalescent soldiers and sailors in practical gardening and related subjects, to which civilians may also be admitted. After consultation and correspondence with officials of government departments, the following letter was written:

THE NEW YORK BOTANICAL GARDEN

November 29, 1918.

THE FEDERAL BOARD FOR VOCATIONAL EDUCATION
280 Broadway
New York City

Gentlemen: The New York Botanical Garden in Bronx Park, New York City, desires affiliation with the Federal Board for Vocational Education, for the vocational training of convalescent soldiers and sailors in practical gardening. The Garden is prepared, in case the necessary funds can be secured, to offer such instruction at once. Land, laboratories, greenhouses, lecture-rooms, museum, and library are immediately available, as well as the services of some members of the staff. Necessary fees may be made the subject of mutual agreement.

The following outlined curriculum may be put into operation if a sufficient number of persons desire such instruction and apply for it. The complete course would be distributed over two years, and certificates issued. Partial elective courses would

require much shorter periods. The greenhouse practice, and much of the lecture and laboratory work would be carried on during the winter, the out-of-door work from spring until autumn. After the inception of the work new students would be admitted every three months, taking up the courses wherever they should be in progress at such times.

Yours very truly
(Signed) W. GILMAN THOMPSON
President

PRELIMINARY OUTLINE OF INSTRUCTION IN GARDENING FOR CONVALESCENT SOLDIERS AND SAILORS

A. Lectures, Field, Museum and Laboratory Work to include:
   1. Soils.
   2. Plant Chemistry.
   3. Elementary Botany.
   4. Plant Physiology.
   5. Garden Botany.
   6. Garden Zoölogy.
   7. Garden Pathology.
   8. Garden Mycology.
   9. Garden Design.
   10. Special lectures and demonstrations on kindred subjects, such as Forestry; Native Wild Plants; Tropical Botany; Tropical Gardening; Old World Gardens; Uses of Plant Products; Bacteriology; Meteorology; Canning and Preserving; Husbandry.

B. Practical Instruction to include:
   1. Greenhouse Practice.

      Preparation of soil. Fertilizers. Sowing. Care of Seedlings. Watering. Potting. Transplanting. Weeding. Propagation by Cuttings. Care of bulbs, tubers and roots. Control of pests. Use of pits and frames.

   2. Vegetable and Fruit Gardening.

      Selection of sites and soil. Preparation of soil. Fertilizers. Spading. Trenching. Drainage. Hoeing. Raking. Sowing. Weeding. Transplanting. Selection of kinds of Fruits and Vegetables. Cultivation. Watering. Spraying.

Harvesting. Cold Frame Practice. Collecting Seeds. Winter Care of Vegetables and of Fruits.

3. Flower Gardening.

Selection of sites and soil. Preparation of soil. Fertilizers. Spading. Trenching. Drainage. Hoeing. Raking. Sowing. Weeding. Transplanting. Cultivation. Watering. Selection of kinds of Flowers. Spraying. Collecting Seeds. Cold Frame Practice. Mulching. Propagation. Care of roots and tubers. Cutting and arrangement of Flowers. Water Gardens. Rock Gardens.

4. Nursery Practice.

Planting and Transplanting. Cultivation. Watering. Weeding. Spraying. Grafting. Budding.

5. Care of Trees and Lawns.

Pruning and Spraying of Trees. Elimination of Boring Insects. Top-Dressing. Mowing and Weeding of Lawns. Felling Trees. Treatment and Care of Woodlands.

6. Garden Carpentry and Painting.

7. Training of Teachers for School Gardens.

Special six-weeks courses in spring and summer.

On December 18, 1918, the Federal Board for Vocational Education, following consultations with its officials, submitted a form (V R 91) to be filled out giving details of organization and personnel of instructors, which was returned to that Board on December 21, 1918. After further consultation, the following correspondence ensued:

THE NEW YORK BOTANICAL GARDEN

January 9, 1919

MR. ARTHUR W. GRIFFIN, Acting D. V. O.
Federal Board for Vocational Education
280 Broadway, New York City

My dear Mr. Griffin:

In consultation with Dr. W. Gilman Thompson, after my interesting interview with you yesterday, when we discussed the formation of a class for instruction in gardening here, as outlined in previous consultations and communications, we suggest that instead of taking up your plan for assembling students elsewhere in the city or vicinity until six or eight are brought together, that the assembling be done here.

We could receive the men one at a time and put them under informal instruction in our greenhouses, laboratories, library, and museum until the requisite number to form a class were obtained, and after that pass to the formal system of instruction as outlined; this would essentially treat the men as special students during the period of the formation of a class.

If this modification should meet with your approbation, you might send us men at any time.

Yours sincerely
(Signed) N. L. BRITTON
Director-in-Chief

FEDERAL BOARD FOR VOCATIONAL EDUCATION
Division of Rehabilitation
District Vocational Office
280 Broadway, New York

January 10, 1919

DR. N. L. BRITTON, Director-in-Chief
New York Botanical Garden
Bronx Park, New York City

Dear Dr. Britton:

I beg to thank you for your valued favor of the 9th inst. which establishes an arrangement for induction of students into your courses on an ideal basis.

On my visit to Washington yesterday I discussed this at length with Mr. Hamilton, who is in charge of training courses. He is intensely interested in the possibilities that may be developed at the New York Botanical Garden, and has asked me to learn from you what might be offered in the way of advanced courses beyond the training you have already outlined.

A copy of your letter of the 9th is being forwarded to Mr. Hamilton for his information.

Yours very truly
(Signed) ARTHUR W. GRIFFIN
Acting D. V. O.

THE NEW YORK BOTANICAL GARDEN

January 14, 1919

MR. ARTHUR W. GRIFFIN, Acting D. V. O.
Federal Board for Vocational Education
280 Broadway, New York City

My dear Mr. Griffin:

I have your valued letter of January 10th. We submitted the whole plan at a meeting of the Garden Board of Managers yester-

View in the Pinetum, the Museum Building in the Distance

day, and received full authority to carry it into effect, so we can accept students at any time you send them. All details were referred to the President and the Director-in-Chief with power.

As regards the question by Mr. Hamilton, relative to advanced courses beyond the training we have already outlined, I would say that we are completely equipped to develop such courses in many subjects, such as plant breeding, plant selection, plant diseases, and various other experimental lines, and will be glad to do this.

Yours very truly

(Signed) N. L. BRITTON
Director-in-Chief

THE NEW YORK BOTANICAL GARDEN

January 15, 1919

MR. ARTHUR W. GRIFFIN, Acting D. V. O.
Federal Board for Vocational Education
280 Broadway, New York City

My dear Mr. Griffin:

I transmit herewith the following resolutions adopted by the Board of Managers of the New York Botanical Garden at a meeting held on January 13, 1919:

> *Resolved:* That the general plan submitted by the President for the instruction of convalescent soldiers and sailors in Practical Gardening in cooperation with the Federal Board for Vocational Education, be and hereby is approved.
>
> *Resolved:* That the curriculum for such instruction, prepared by the Director-in-Chief and approved by the Scientific Directors at their meeting of December 14th, 1918, be and is hereby adopted, subject to such modifications as may be found desirable by the Scientific Directors.
>
> *Resolved:* That the further oganization of this instruction, including authority to ask for financial support, to establish fees, to admit civilians, to detail present employees, to employ additional lecturers and assistants and to obtain necessary equipment, be and hereby is referred to the President and the Director-in-Chief with power.

Mr. Mike Wozniak, mentioned in your latter of January 8th, reported here this afternoon, and will be admitted as the first student.

There appear to be only two matters to which further consideration should be given at the present time:

1. As to fees and their method of payment, in which we wish to meet your views. We suggest that the fee be placed at $15 a month, or $180 a year. Should we send you bills for such dues?
2. As to discipline. We have assumed that ordinary rules of discipline would be sufficient, enabling us to expel students for cause, but only after a presentation of the facts in such possible cases to you, and we may hope that no such cases will arise.

Yours very truly
(Signed) N. L. BRITTON
Director-in-Chief

Both of the matters referred to in the preceding letter were immediately determined affirmatively. The first student was registered on January 16, 1919, and up to the time of printing this document nine students have been admitted. The men were referred to practical work in greenhouses and out-of-doors, in charge of foreman gardeners, until the end of February, and on the first Monday in March formal instruction as a class was commenced. The following circular was then issued:

THE NEW YORK BOTANICAL GARDEN

INSTRUCTION IN GARDENING

1919

Opportunities

An excellent opportunity for pleasant and profitable employment is now offered to men in practical gardening. In commercial and private greenhouses the demand for trained men is far beyond the supply. Public parks need foremen and superintendents who understand all phases of ornamental gardening. A continually increasing number of private estates are employing gardeners and require men trained not only in gardening proper, but in the elements of landscape design, road and path making, and the general care of gardens and grounds. Heretofore most of the gardeners have been British, Dutch, or Germans, trained in gardening before emigrating to America. Since immigration has ceased, the demand for gardeners must in the future be filled by Americans. During the war the wages paid to gardeners have steadily increased. While they do not yet equal the wages in some industrial pursuits, the gardener has many other compensations. His position is not temporary, his work is pleasant, healthful, and diversified, and in many cases gardeners on private estates have their house and vegetable garden furnished and live in unusually attractive situations.

To meet the growing demand for trained gardeners, the New York Botanical Garden has established courses of instruction in gardening and has extended its remarkable facilities to the students.

Facilities

The grounds of the Botanical Garden occupy nearly 400 acres of Bronx Park, New York City. They are traversed by the Bronx River and adorned by several small lakes. Part of the ground is occupied by natural woodlands and the remainder has been laid out by trained landscape architects into ornamental plantings, including flower beds, rose and iris gardens, shrubbery

and arboretum, and the whole area is intersected by miles of walks and drives. The grounds alone offer an object lesson in all details of outdoor gardening and provide actual experience for the students in maintaining, developing and managing them.

In the Garden are two extensive ranges of greenhouses, one of which is the largest glasshouse in America. There is also a range of propagating houses with ground adjacent for experimental and practice gardens. Also within Bronx Park are the extensive glasshouses of the Park Department, in which students may observe the propagation of plants on a large scale. With these unrivalled facilities, the students in gardening have the best possible opportunity to learn by actual practice all details of greenhouse work. There students may become familiar with many thousand different kinds of plants and their cultivation.

The Botanical Garden also has at the disposal of the students an extensive library of horticultural books and laboratories and equipment for class work indoors.

Methods of Instruction

The instruction is given by the staff of the Botanical Garden and officers of other institutions, insuring that the students will be at all times under the direction of highly trained specialists. The work is of three kinds. Under the supervision of the Head Gardener and his foremen, the students spend about one half of their time in actual practical work, including the subjects outlined in the curriculum. On one or two days each week members of the Garden staff or other specialists present lectures or demonstrations on subjects of interest to gardeners and on which all gardeners should be informed. The remainder of the time is spent in class work, and the students learn from lectures and laboratory study the fundamental principles of the sciences upon which successful gardening is based. Students who complete the course not only know what to do and how to do it, but they also understand the reason for all garden operations. In other words, they are not garden laborers, but trained gardeners.

The Mansion, used as a School-house for Gardening Instruction

Attendance

Required attendance is from 9:30 A.M. to 4:00 P.M., Mondays, Tuesdays, Wednesdays, Thursdays and Fridays, except holidays, with an interval from 12:30 to 2 o'clock between morning and afternoon sessions. Students will obey all orders of Mr. Kenneth R. Boynton, marshal of the Garden School, and of the other instructors. The main library in the Museum Building and the special library in the Mansion are available for students' reading during the noon intermission, on afternoons after exercises, and on Saturdays, Sundays and holidays. During stormy days on which outdoor work has been planned, instruction will be given in the greenhouses, laboratories, lecture rooms or museums.

Students will be admitted at any time and will take up the course of instruction where is it progressing at the time of their entrance.

Curriculum

[Subject to modification in details.]

1. *Winter Quarter, ending April 11*

Greenhouse Practice—Two days (Foreman Becker).
Elementary Botany—Three mornings (Dr. Stout).
Garden Botany—One afternoon (Mr. Nash and Mr. Boynton).
Special Lectures or Demonstrations—Two afternoons.

2. *Spring Quarter, April 14–June 27*

Vegetable and Fruit Gardening—Two mornings (Foreman Finley).
Flower Gardening—Two mornings (Mr. Boynton).
Greenhouse Practice—One morning (Foreman Becker).
Garden Botany—Two afternoons (Mr. Nash and Mr. Boynton).
Garden Zoölogy—One afternoon (Dr. Southwick).
Garden Carpentry—One afternoon (Mr. Corbett).
Special Lectures or Demonstrations—One afternoon.

3. *Summer Quarter, July 7–September 26*

Vegetable and Fruit Gardening—Two mornings (Foreman Finley).
Flower Gardening—Two mornings (Mr. Boynton).
Plant Physiology—One morning (Dr. Stout).

Garden Botany—Two afternoons (Mr. Nash and Mr. Boynton).
Garden Zoölogy—One afternoon (Dr. Southwick).
Special Lectures or Demonstrations—Two afternoons.

4. *Autumn Quarter, October 6–December 19*

Elementary Botany—Two mornings (Dr. Stout).
Plant Chemistry—One morning (———).
Vegetable, Fruit and Flower Gardening—One morning (Mr. Boynton and Foreman Finley).
Greenhouse Practice—One morning (Foreman Becker).
Soils—One afternoon (———).
Garden Botany—Two afternoons (Mr. Nash and Mr. Boynton).
Garden Zoölogy—One afternoon (Dr. Southwick).
Special Lectures or Demonstrations—One afternoon.

Lectures and Demonstrations

Special lectures and demonstrations on one or two afternoons each week in the above schedule of attendance will include nursery and cold-frame practice; care of trees and lawns; mulching; laying out and construction of paths; care of manure and of leaf-mould; fertilizers; drainage; forestry; native wild plants; tropical gardening; tropical botany; old world gardens; uses of plant products; bacteriology; bee-keeping; husbandry; canning and preserving; winter care of vegetables; construction and care of greenhouses; and other subjects.

The schedule for the second year's course (1920) will be announced subsequently. In addition to a continuation and elaboration of subjects covered in 1919, it is planned to include surveying, garden design, garden pathology and garden mycology.

Certificate

A certificate will be issued to students who satisfactorily complete a two-years' course.

All communications should be addressed

The New York Botanical Garden,
Bronx Park,
New York City

TREES AND CHILDREN

Among the beautiful beeches in the Forest of Fontainebleau, in France, stands one sacred to King Louis IX, called the Tree of Saint Louis. Because of the virtue and piety of this king, the tree of Saint Louis was afterwards chosen as a place for worship, somewhat after the custom of the druids, who worshiped under the oak, and the fire-worshippers, who prayed beneath the plane-tree in the plains of Persia. After the French revolution, such homage to royalty was forbidden, but the peasants of the neighborhood continued to come by night and hang their wreaths and woven beads on the sacred tree.

I believe that children might be taught to reverence to some extent every tree for its beauty and usefulness, as nobles and peasants reverenced the Tree of Saint Louis.

The children of the Orient have the bamboo, the ginkgo, the teak, the banyan, and the oriental plane; those of Syria the ancient olive trees and cedars of Lebanon. The children of Norway have the Norway maple, and the Norway spruce; those of Sweden, who live in the very home of Christmas, have also beautiful firs and birches. The Germans love their lindens and horsechestnuts and fill their fairy stories with references to fir trees; the Swiss children spend their summers on the Alpine pastures surrounded by tall and stately firs and spruces; the Austrian children find the larch on the mountains and a beautiful species of pine in some of the valleys, from the wood of which they carve their Christmas toys; the Italian children, even in the crowded streets of Venice and Naples, cannot fail to know something of the chestnut and olive orchards on the mountain slopes and the pollarded willows of the lowlands. The children of rural France love the long rows of poplars that shade the highways, and those of the cities love their beautiful parks and shaded boulevards; the London lad occasionally turns his eyes from his cricket bat to gaze upon a majestic field elm or a grove of oaks or beeches, while the farmer's boy loves to linger in the shade of the elms and oaks that everywhere dot the English landscape.

In Cuba, children play beneath wide-spreading laurel trees and

which Cortez reviewed his shattered army. The children of California boast of the giant redwoods, still the largest of all trees in spite of rival claims; while those of Washington and Oregon know red firs and other trees almost as large. The boy of the southern United States delights in the magnificent oak, chestnut, and pine forests, and in the beauty and perfume of the southern magnolia; while the boy of the North glories in "the murmuring pines and the hemlocks" and the valuable forests of maple, beech, and birch.

Children are exceedingly active both in body and brain. It is difficult to injure them physically or mentally if the conditions are favorable for their activity. Natural history studies are peculiarly adapted to the development of both the mind and body of the child. A great deal more might be taught them than is now generally attempted, which would advance them mentally and improve them morally, especially in so far as their life-long happiness is concerned.

The interests of the man and woman are largely predetermined by the interests of the boy and girl. It often happens that without making an effort to increase one's knowledge by special study, this knowledge accumulates on account of having been favorably impressed with a subject at an early age. Public men often act upon public questions on the basis of information and training gained in childhood. No one yet knows how deeply the character and actions of men are influenced by impressions received when very young.

Both with children and adults, there are always things to do and things not to do.—In the matter of shade-trees, parks, state forests, national forests, there are things to do and things not to do. If an early start were made with the child to instil the idea of conservation, or non-destruction, and to inculcate the royal palms; while in Mexico, girls and women loiter and wash their clothes beneath the willows that fringe the streams or gather wild fruits and flowers under oaks and Montezuma pines. Every child in Mexico City knows the grove of giant cypress trees adjoining Chapultepec and "La Noche Triste" tree, under

proper economic attitude toward our parks and forests, many vexing questions would largely settle themselves, the law of use without abuse appealing naturally to all fair-minded and properly instructed people.

Trees are especially adapted to child study. They are prominent, useful, abundant, beautiful, and varied, individually and collectively, throughout every season of the year. In summer, they shelter us from the sun; in winter, they shed their leaves and let the sunshine in. When other natural objects are dead or dormant or covered with snow, trees still afford most attractive objects of study. In the springtime, they put forth their leaves, which serve as beautiful and characteristic "visiting cards," and make their appeal for recognition and remembrance not only during the luxuriant growth of summer but also when the colors have been touched and glorified by autumn. The leaves are easily collected and preserved and may be used for identification until more and better characters are discovered and studied. Children may also be made to realize that they can assist in protecting trees and in destroying many of the insect pests that are usually so abundant about cities and towns.

In studying history, art, literature, mythology, and the customs of various peoples, a child finds many references to trees and tree-lore. If we add to these sentiments and fancies some definite and accurate knowledge of the more common trees in one's locality, together with the life-history and needs of trees in general, it means a much broader and happier life for the child and man. Trees will then never be forgotten, but will be recognized and loved as the faces of friends; and, when life draws near to its close, one may come to realize that a marble tomb and eternal sleep for the body's dust is not to be compared with a grave in the forest beneath some noble tree, where life and activity and beauty may be repeated through the cycles for the benefit of every flower that blooms in its shade, every bird that sings in its branches, and every human being who loves to walk and muse in the forest solitudes.

W. A. Murrill

A GENUS OF PLANTS INTERMEDIATE BETWEEN *PETALOSTEMON* AND *PAROSELA*

In a part of the North American Flora now going through the press, there appears an unpublished generic name in the key. As the tribe to which it belongs is too large to be treated in a single part of said publication, and the description belonging to the generic name will follow in the subsequent part, which will not be published for a few months, it is necessary to publish the following technical notes and description in advance.

Linnaeus in the first edition of his Genera Plantarum (1737) proposed a genus *Dalea*, but merged it later into *Psoralea* and it appeared as *Psoralea Dalea* in his Species Plantarum (1753). A. L. Jussieu resurrected the Linnaean genus in 1789, but in the meantime the same name had been used by several botanists for other genera, so that *Dalea* (L.) Juss. can not be maintained. Lately the name *Parosela* Cavanilles has been taken up for what was known as *Dalea* (L.) Juss.

Michaux mistook a plant of the eastern United States for *Psoralea Dalea* L., which was from Vera Cruz, Mexico. As double binomials were not in vogue then, he proposed the name *Dalea Linnaei* in 1803. Willdenow, in the same year (apparently a little earlier) described the United States plant as *Dalea alopecuroides*, under which name it has usually been known, and proposed the name *D. Cliffortiana* for the Vera Cruz plant. The latter name has passed into oblivion. De Candolle, evidently without thoroughly investigating the matter, united the two species. Following him, MacMillan, in 1892, proposed the combination *Dalea Dalea*, and Britton, in 1894, that of *Parosela Dalea*. Both applied it to the United States plant.

Ventinat. in 1799, and Willdenow, in 1803, included in *Dalea* not only what has usually been known under that name, viz., the species of *Parosela* Cav., but also the known species of *Petalostemon* Michx. and *Kuhnistera* Lam. Most authors have united the latter two genera, but kept *Dalea* distinct. The characters used to distinguish *Dalea* and *Petalostemon* from each other are given in the New Gray's Manual, page 501, in the best condensed form I know of, as follows:

"**Dalea.** Corolla imperfectly papilionaceous. Stamens 9 or 10; the cleft tube of filaments bearing 4 of the petals about its middle.

"**Petalostemum.** Corolla scarcely at all papilionaceous. Stamens 5; the cleft tube of filaments bearing 4 of the petals on its summit."

The United States plant mentioned above, *Dalea alopecuroides* Willd., falls distinctly under *Dalea* as here characterized, and so do all the species included by Cavanilles in the original diagnosis of *Parosela*; but the Vera Cruz plant, *Psoralea Dalea* L., the plant on which the genus *Dalea* (L.) Juss. was based, does not. Turning to plate 22 in Hortus Cliffortianus, which was drawn from a cultivated plant from Mexican seeds, known to Linnaeus, afterwards raised in his own garden, and cited in his Species Plantarum, it may be seen that it represents not *Dalea alopecuroides* Willd. but *D. nigra* Mart. & Gal. of Mexico. The latter has 10 stamens, but the corolla is not at all papilionaceous and 4 of the petals are inserted at the end of the staminal tube; they are wholly distinct, short-clawed, and only slightly oblique, just as in *Petalostemon*. In *Parosela* the wings and keel-petals are inserted lower or higher up on the staminal tube, but not at the end thereof, the keel-petals slightly higher up than the wings. The blades of both are distinctly clawed, very oblique, with a basal lobe on the upper side, and the keel-petals are usually more or less united along the lower edge near the tip.

In other words, *Parosela Dalea* L. combines certain characters of the genera *Petalostemon* Michx. and *Parosela* Cav. (*Dalea* as understood by De Candolle, Bentham and Hooker, and American authors generally). This species is, however, not the only one with the characters mentioned. There is a distinct group of plants, although not very large, of the southwestern United States and Mexico, which agree in these respects. In habit and structure of the flowers, they are almost identical with typical *Petalostemon*, except that the stamens are 9 or 10, instead of 5.

There are three ways in which the difficulty could be solved:

1. By uniting *Petalostemon* and *Parosela* into one genus, which few botanists would be willing to do.

2. By transferring these species from *Parosela* or *Dalea* to *Petalostemon*, which would meet with perhaps as little favor, as the latter genus has always been known by its 5 stamens.

3. By proposing a new genus to include these species, as *Dalea* is not an available name. I have chosen the last method.

As nearly all the species differ from *Psoralea Dalea* L. (*Dalea nigra* Mart. & Gal.) in being perennials and closely resembling each other in habit, it seems better to select the type of the new genus from among these rather than to assign *Psoralea Dalea* L. as such.

The type selected, *Dalea albiflora* A. Gray, and several of its closer relatives are found in Arizona, New Mexico, and northern Mexico. I therefore think it fitting to associate these plants with a student who has done much botanical work in this region and take pleasure in naming the genus in honor of Professor John James Thornber of the University of Arizona.

Thornbera Rydberg, gen. nov.

Perennial or annual herbs, related to *Petalostemon* and *Parosela*. Flowers in usually dense spikes. Calyx campanulate, 10-ribbed, 5-lobed. Petals all distinct; banner inserted on the hypanthium in the bottom of the calyx, with a cordate or ovate blade and a long claw; wings and keel-petals similar to each other, subsessile or short-clawed, inserted at the mouth of the staminal tube, the blades oval or obovate, slightly oblique but not lobed at the base. Stamens 10 or 9, monadelphous, the upper portion of the filaments free. Fruit indehiscent, 1-seeded.

Type species, **Thornbera albiflora** (A. Gray) Rydberg. *Dalea albiflora* A. Gray, Pl. Wright. 2: 38. 1853.

P. A. RYDBERG

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

ANACARDIACEAE. Sumac Family

Cotinus. SMOKE-TREE

Cotinus americanus. AMERICAN SMOKE-TREE.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Cotinus Cotinus. EUROPEAN SMOKE-TREE.
Location: Fruticetum.
Natural distribution: Europe and Central Asia.

Rhus. SUMAC

Rhus copallina. MOUNTAIN SUMAC.
Location: Fruticetum.
Natural distribution: Eastern United States.

Rhus glabra. SMOOTH SUMAC.
Location: Fruticetum. Wild, common.
Natural distribution: Eastern North America.

Rhus hirta. STAGHORN SUMAC.
Location: Fruticetum.
Natural distribution: Eastern North America.

Rhus hirta var. **dissecta.** PLUMED STAGHORN SUMAC.
Location: Fruticetum. West border, across road from upper lake.

Rhus javanica. OSBECK'S SUMAC.
Location: Fruticetum.
Natural distribution: China.

Rhus Michauxii. DWARF SUMAC.
Location: Fruticetum.
Natural distribution: North Carolina to Georgia.

Rhus Potaninii. CHINESE SUMAC.
Location: Fruticetum.
Natural distribution: Central and western China

Schmaltzia. Scented Sumac

Schmaltzia crenata (*Rhus aromatica*). Fragrant Sumac.

Location: Fruticetum.

Natural distribution: Eastern United States and Ontario.

Toxicodendron. Poison Sumac

Toxicodendron radicans. Poison Ivy.

Location: Wild, common.

Natural distribution: North America.

Toxicodendron verniciflua. Lacquer Tree.

Location: Arboretum.

Natural distribution: Japan, China and the Himalayas.

AQUIFOLIACEAE. Holly Family

Ilex. Holly

Ilex bronxensis. Northern Winterberry.

Location: Fruticetum.

Natural distribution: Northeastern United States.

Ilex crenata. Japanese Holly.

Location: Fruticetum. Conservatory beds. Mansion.

Natural distribution: Japan.

Ilex crenata var. **microphylla.** Small-leaved Japanese Holly.

Location: Fruticetum.

Ilex decidua. Swamp Holly.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Ilex glabra. Inkberry.

Location: Fruticetum.

Natural distribution: Eastern United States.

Ilex montana (*Ilex monticola*). Large-leaved Holly.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Ilex opaca. American Holly.

Location: Fruticetum.

Natural distribution: Eastern United States.

Ilex serrata. SIEBOLD'S HOLLY.

Location: Fruticetum.

Natural distribution: Japan.

Ilex serrata var. **argutidens.** SHARP-TOOTHED JAPANESE HOLLY.

Location: Fruticetum.

Ilex verticillata. VIRGINIA WINTERBERRY.

Location: Fruticetum.

Natural distribution: Eastern United States.

Nemopanthus. WILD HOLLY

Nemopanthus mucronata. WILD HOLLY.

Location: Fruticetum.

Natural distribution: Northeastern North America.

CELASTRACEAE. Staff-tree Family

Euonymus. STAFF-TREE

Euonymus alatus. WINGED SPINDLE-TREE.

Location: Fruticetum. Conservatory beds.

Natural distribution: China and Japan.

Euonymus alatus var. **subtriflorus.** SMALL-FRUITED WINGED SPINDLE-TREE.

Location: Fruticetum.

Euonymus atropurpureus. BURNING BUSH.

Location: Fruticetum.

Natural distribution: Eastern North America.

Euonymus Bungeanus. BUNGE'S SPINDLE-TREE.

Location: Fruticetum.

Natural distribution: China and Manchuria.

Euonymus Bungeanus var. **semipersistens.** BUNGE'S ROSE-FRUITED SPINDLE-TREE.

Location: Fruticetum.

Euonymus europaeus. SPINDLE-TREE.

Location: Fruticetum.

Natural distribution: Europe to eastern Asia.

Euonymus europaeus var. **variegatus.** VARIEGATED SPINDLE-TREE.

Location: Fruticetum.

Euonymus Maackii. MAACK'S SPINDLE-TREE.
Location: Fruticetum.
Natural distribution: Northeastern Asia.
Euonymus nanus. DWARF WEEPING EUONYMUS.
Location: Fruticetum.
Natural distribution: Western Asia to western China.
Euonymus obovatus. RUNNING STRAWBERRY BUSH.
Location: American Wood Garden.
Distribution: Northeastern United States.
Euonymus patens. SPREADING SPINDLE-TREE.
Location: Fruticetum.
Natural distribution: Central China.
Euonymus radicans. CREEPING JAPANESE EUONYMUS.
Location: Fruticetum.
Natural distribution: Northern and central Japan.
Euonymus radicans var. **acutus.** ACUTE CREEPING EUONYMUS.
Location: Fruticetum.
Euonymus radicans var. **Carrierei.** CARRIERE'S CREEPING EUONYMUS.
Location: Fruticetum.
Euonymus radicans var. **variegatus.** VARIEGATED CREEPING EUONYMUS.
Location: Fruticetum.
Euonymus radicans var. **vegetus.** BROAD-LEAVED CREEPING EUONYMUS.
Location: Fruticetum.

Celastrus. SHRUBBY BITTER-SWEET

Celastrus articulatus. JAPANESE SHRUBBY BITTER-SWEET.
Location: Viticetum.
Natural distribution: Japan and China.
Celastrus articulatus var. **punctatus.** SMALL-LEAVED JAPANESE SHRUBBY BITTER-SWEET.
Location: Viticetum.
Celastrus scandens. SHRUBBY BITTER-SWEET.
Location: Wild, common.
Natural distribution: Eastern United States and Quebec.

SPRING LECTURES, 1919.

Apr. 5. "The Advent of Spring," by Dr. N. L. Britton.

Apr. 12. "Scenic Features of North American Mountains," by Mr. LeRoy Jeffers.

Apr. 19. "The Place of Trees in Men's Affairs," by Mr. Carl Bannwart.

Apr. 26. "Some Interesting Tropical Trees," by Dr. W. A. Murrill.

May 3. "Evergreens," by Mr. G. V. Nash.

May 10. "Plant Hybrids: How Produced: Their Uses," by Dr. A. B. Stout.

(Exhibition of Flowers, May 10 and 11.)

May 17. "The Future of American Forestry," by Professor J. W. Toumey.

May 24. "The Recognition of Medicinal and Poisonous Properties in Unknown Plants," by Dr. H. H. Rusby.

May 31. "Floral and Scenic Features of the Panama Canal Zone," by Dr. M. A. Howe.

June 7. "The Botanical Garden at Buitenzorg, Java," by Dr. H. A. Gleason.

(Exhibition of Roses and Peonies, June 7 and 8.)

June 14. "Destructive Insects," by Dr. F. J. Seaver.

NOTES, NEWS, AND COMMENT

Dr. John H. Barnhart, bibliographer, spent a few days in Washington and Philadelphia during the first week in February, engaged in bibliographic work.

Hon. Francis D. Gallatin has been appointed President of the Board of Park Commissioners for the city of New York, and becomes thereby a member of the Board of Managers of the Garden.

Corporal Kenneth R. Boynton, head gardener's assistant and formerly editor of the JOURNAL at the New York Botanical Garden, has been honorably discharged from the United States Army and has resumed his work at the Garden as Marshal of the Garden School.

Mr. J. B. Norton, of Washington, paid a brief visit to the Garden in February to examine the herbarium specimens of *Smilax*. Mr. Norton expects to leave soon for China, in connection with the Office of Seed and Plant Introduction.

Dr. John K. Small, head curator, spent ten days during February on a collecting trip in the southeastern states. He visited several coastal points as far south as Charleston, South Carolina, and returned with some valuable material, chiefly specimens of cacti.

The following botanists have registered in the library during the winter: Herbert W. Faulkener, Washington, Conn.; Mrs. Nellie F. Flynn, Burlington, Vt.; Dr. Forrest Shreve, Tucson, Ariz.; Professor W. W. Rowlee, Ithaca, N. Y.; Miss Caroline C. Haynes, Highlands, N. J.; Professor Alexander W. Evans, New Haven, Conn.; Professor C. P. Smith, College Park, Md.; Miss Ellen Miller, and Miss Margaret C. Whiting, Deerfield, Mass.

Miss Margaret C. Whitney and Miss Ellen Miller, of Deerfield, Massachusetts, joint authors of the "Wild Flowers of the New England States," visited the Garden on February 11 in company with Miss Alice Donlevy. They have established an Arts and Crafts shop in their native town and conducted a series of experiments in dyeing with vegetable dyes on plant fabrics, particularly homespun linen, using many of our native plants, including butternut, sumac, osage orange, red maple, and oak galls, and also such imported dyes as indigo, madder, logwood, fustic and cutch (*Acacia catechu*).

At the conservatories, in house no. 4, the large plant of *Medinilla magnifica* is now in full bloom and strikingly beautiful. This species is one of the most showy members of the meadow-beauty family, Melastomaceae, and this is an unusually large specimen for greenhouse cultivation. Its numerous pendulous flower clusters, of a bright rose pink, make it a conspicuous object in that house. In the aquatic house, no. 9, is a plant in full flower of the Florida swamp-lily, *Crinum americanum*. This is the only species of the genus native to the southeastern United States, and inhabits shaded river swamps or open marshes from Florida to Texas; it is also found in some parts of Cuba and the Isle of Pines. Another plant of interest in this house is the Egyptian paper plant, *Cyperus Papyrus*, with its tassel-like inflorescences at the ends of the tall slender stems.

In the fruticetum the Asiatic hazelnut, *Corylus pontica*, has already passed flowering, having first opened its catkins late in January. Thunberg's willow, *Salix gracilistyla*, is covered with "pussies," which almost any warm day now may break into bloom; it is one of the earliest to show signs of activity, accommodates itself to either dry or wet situations, and is one of the best of the shrubby willows. The goat willow, *Salix caprea*, is also in "pussies," and the first warm days will bring it into bloom. The Japanese Mahonia, *Odostemon japonicus*, has its flowers in the bud stage and will be in bloom ere long. Perhaps the most attractive plant in the fruticetum has been the Japanese witch-hazel, *Hamamelis japonica*. Covered with its mantle of bright yellow flowers, it offers a striking contrast with its neighbors, still in their dormant condition of naked branch and limb; attractive as it is in itself, it is doubly so coming at a time when most other shrubs and trees give no sign of an early awakening.

In the flower gardens the snowdrops have been bold in their efforts to tell us that spring is coming; they are very optimistic, for their first flowers appeared late in January, and have appeared scatteringly ever since. The Cloth-of-Gold crocus came into full flower during the second week of March.

Exhibition of Plant Forms Used in Ornament

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THE EXHIBITION OF PLANT FORMS USED IN DESIGN

(WITH PLATES 230 AND 231)

As announced in the JOURNAL for February and also by cards mailed to all members, a joint exhibition of plants and of art objects decorated with plant forms was installed in Class-room B at the Metropolitan Museum of Art and was available for public examination and instruction from March 15 to April 21, 1919. The exhibition was largely attended, many classes of students as well as individuals taking advantage of the opportunity, and the display elicited much favorable comment on its beauty and on its educational value.

The exhibition was the natural development from a similar, but much smaller, one given at the Mansion, New York Botanical Garden, last October, when Mrs. Britton, assisted by Miss Alice Donlevy and Dr. E. B. Southwick, showed a small loan collection of art objects and illustrated them by living specimens of the plants which were used in their decoration. At that time Miss Alice Donlevy made a plea for less copying of old designs and Mrs. Britton for the use of native plants in ornament. Mr. Richard T. Bach, of the Metropolitan Museum, also spoke to art students from the Cooper Institute who were present.*

The installation and description of the botanical part of the exhibition were referred to Dr. W. A. Murrill, Supervisor of Public Instruction at the Garden, who was aided by other employees and members. Dr. Murrill was in attendance throughout

* Journal of the New York Botanical Garden 19: 299.

the exhibition for explanation and instruction, and the quotations which follow are chosen from his remarks. The selection of art objects was referred to Mr. Bach, and they were arranged and grouped by Mrs. Vaughan, Miss Abbot and Miss Morris. The representatives of the two institutions worked coöperatively and enthusiastically and are largely responsible for the success of the exhibition.

The room used is nearly forty feet square, with a window on the south end and one on the east facing the entrance. Museum cases were arranged about the walls and in the center of the room, while the remaining wall space was covered with textiles and the floor space with screens and living plants.

The bright and eager faces of art students as they began a closer inspection of the exhibit would have been an inspiration to a teacher of any subject; but with such a theme, involving as it did many centuries of art, literature, religion, and other forms of culture, and reaching back to the earliest artistic efforts of man, one could not fail to do his best.

"By way of introduction, your attention is called to the vertical carved panel and the brilliant drapery on the wall to your right. The motive of the first is lilies, a vase of which stands nearby; and you will notice how these flowers have been arranged in two parallel rows to fit the space. If they had been copied exactly, the result might have been artistic but not an example of decorative design.

"The motive used in the Turkish textile is the ripe fruit of the pineapple, a specimen of which is shown here, together with a young growing plant. The treatment is much broader and more conventional than in the wood-carving, so that you find it difficult to decide at first sight just what the motive was.

"Design is selection and arrangement. Geometric patterns may be used or motives may be adapted from natural objects. Flowers, fruits, and foliage have furnished patterns for decorative design for many centuries."

CASE I

PLANTS: Hyacinth, iris, marigold, pineapple plant and fruit, carnation, red cedar to represent the form of the cypress; pressed specimens of iris; colored figures of iris, opium poppy, pink; photographs of cypress trees; colored figures of oriental poppy and, on the adjacent screen, almond blossoms.

ART OBJECTS: Textile with marigold and iris, textile with morning-glory and pomegranate flowers, Indian pipe case of carved ivory with oriental poppy leaves and flowers, tile with almond blossoms, etc. On the walls adjoining: Textile with sprays of single pink hyacinths, Asia Minor tile with single blue hyacinths and poet's narcissus, textile showing almond tree planted in front of the cypress, and a series of Asia Minor wall tiles of the seventeenth century with the cypress, rose, late tulip, and carnation used as motives.

"After you have sufficiently admired the arrangement and coloring of the iris and marigold flowers in that textile, you should examine rather closely the wall tiles to the left of and above the case. In the little Persian textile just above the cypress photographs, you will see an almond tree represented in flower with a cypress tree as a background. This method of arrangement will be seen later in many forms, sometimes reduced to a mere blue wave or other conventional form with a row of circular patterns along the central axis to represent the almond blossoms.

"The large screen behind us contains a number of pressed specimens and colored figures of plants that have been used in decorative design in Europe and Asia; among them the bryony, almond, snapdragon, olive, oriental plane, aster, sunflower, hepatica, strawberry, foxglove, honeysuckle, oriental and field poppies, iris, violet, peony, and Japanese ivy. Many of them naturally belong in the cases with the art objects, but there is not room for them."

THE SOUTH WINDOW

"The sheaf of grain represents the use of wheat and other cereals in laces, wood-carvings, etc. Sometimes the grains were arranged in symmetrical patterns, as in this piece of lace, but usually the entire heads were used, as in this remarkable piece of drawn-work. Mrs. Robinson told me the other day that she once saw in a house in Richmond, Virginia, some door casings beautifully decorated with designs obtained from stalks of ripe wheat. In one of these lace patterns, you will notice designs resembling wheels. These refer to the custom in vogue in certain parts of Asia where circles of wheat are left uncut, being dedicated to one of the pagan gods who was supposed to bring happiness.

"That French Gothic wood-carving over the case contains three plant motives, the thistle, the grape, and the oak, each represented by foliage and fruit. Specimens of the thistle are attached to the wall adjoining, while grape and oak specimens are to be found elsewhere in the room."

The Acanthus Exhibit

PLANTS: The classic acanthus, *Acanthus mollis*, and a wild species from tropical Africa in flower; the artichoke, also used in architecture, and the poet's narcissus.

ART OBJECTS: Capital of Roman Corinthian column in plaster, with a splendid dark-green tapestry on the wall behind it, over which is suspended a melophone; many objects in the museum case showing the acanthus used as a decorative motive in wood-carvings, textiles, silver, steel, bronze, terra cotta, etc. In the Syrian prayer rug covering the back of the case the pomegranate is the principal motive.

"The acanthus is the plant beloved by architects. Two species grew wild in southern Europe, *Acanthus mollis* and *Acanthus spinosus*, both used on account of their wonderful foliage. This is beautifully shown in the seventeenth-century Italian tapestry behind the Roman capital and in the handsome breastplate of embossed steel by Negroli, of Milan. As you walk through the halls of this building or along the streets, you will recognize the acanthus as a fundamental motive. Look through the window at the two main columns of this building, which are surmounted with capitals of this order. Callimachus, the inventor of the Corinthian capital, is said to have obtained the idea from a tile-covered basket placed over a tomb, about which the leaves of an acanthus plant had grown in profusion."

The Lotus Exhibit

PLANTS: Herbarium specimens and fruits of the American lotus, which is practically identical with the oriental species in form, and a colored figure of a water-lily to show the structure of the flower; several water-lilies in vases.

ART OBJECTS: Chinese silk with foliage and flowers of lotus and chrysanthemum treated naturalistically, but with medallions conventionally arranged; handles of a bronze vase showing unopened lotus flowers; a Japanese bronze of the last century showing the entire lotus plant with foliage, flower, and fruit; vases, pottery, brasses, and other objects using the lotus as a motive.

"The lotus is one of the oldest, as well as one of the most beautiful, plant motives ever used. It grows in the valley of the

Nile, and was used by the Egyptians, together with the papyrus and palm, in all forms of decorative art. It is now considered the origin of the well-known 'palmette,' or 'honeysuckle,' design. In the statue of Iny and Rennut, upstairs, you will remember that Rennut's long curled wig is bound about her forehead with a band of lotus flowers. There were two species of 'lotus' known to the Egyptians, one with white or pinkish flowers (*Nelumbo*) and the other with blue flowers. The latter, *Castalia coerulea*, is shown near the center of the famous stela of Menthu-weser in one of the Egyptian rooms.

"The true lotus must not be confused with the plant referred to in Tennyson's poem about the 'mild-eyed lotus-eaters.' That was the jujube, a prickly shrub bearing fruits resembling a plum or date and much used as a dessert. The United States Department of Agriculture has recently introduced it from the Orient into many southern parts of this country. Homer describes Ulysses as arriving at the coast of Libya, where many of his sailors ate the jujube fruits and lost their desire to return to home and friends.

"Passing by this Chinese textile, in which the poet's narcissus is too naturalistically treated, and the old Persian hanging beautifully decorated with pomegranate flowers, we come to Case 3, showing the use of the grape as a motive."

The Grape Exhibit

PLANTS: Herbarium specimens of grape foliage and a bunch of grapes.

ART OBJECTS: Wood-carvings, textiles, ivory, metal, tile, pottery, and plaster, showing the grape used as a motive.

"Just as the lotus was a sacred plant in the Orient, the emblem of the Buddhist religion; so the grape, when freed from its connection with Bacchus and his pagan rites, became the emblem of the Christian religion. Christ said, 'I am the vine; ye are the branches.' Notice the rhythm and the artistic arrangement of this Coptic textile, and in this wood-carving, where the heads of wheat and the clusters of ripe grapes signify the bread and wine of the communion service.

"In Persian legendary lore the cypress tree was emblematic of

eternal life and the almond tree of love, and the Persian textile near Case I shows cypress trees with almond trees planted in front of them. What may be called the 'cypress-almond' motive may sometimes be much reduced and obscure, but it is present in most of Persian decorative art and in that of Asia Minor as well, although the latter also shows Turkish influence. The two Asia Minor brocades on the wall in the corner both illustrate this motive. In the first, where late tulips are conspicuously employed, the alternating clusters of leaves in twos and threes are designed from the cypress tree with a row of almond blossoms along the central axis. In the second, the principal design is a palmette derived from the carnation flower, while the cypress-almond motive appears in the two narrow leaves just below the flower."

Oriental Rugs

"It may be of interest to you at this point to say a word or two about oriental rugs, a number of which are in exhibit in this room. The rugs of the Orient were pictures, and usually associated with religious motives. Those of the Caucasus were cold in color and full of geometric designs; Indian rugs show exact copies of foliage and flowers; Persian rugs are possibly the best examples of floral patterns used as motives only; while Chinese rugs contain both floral and geometric motives with various mystic symbols, many of them being unequaled in beauty and priceless in value. The key to the Turkish rug is the 'prayer niche,' which pointed toward Mecca. The space in the niche was usually blue, which, according to Persian ideas, signified 'sincere silence.'

"You noticed that the Persian hanging which we passed a short time ago was very thin and contained no knots. This was true of all the early rugs, the knots being added to give thickness and body to them used on cold or damp ground. Only two kinds of knots—really loops—were employed in oriental rugs. The number of knots to the square inch determined the compactness of the fabric and the direction of the pile had a marked influence on its color."

Exhibition of Plant Forms Used in Ornament

The Garden Carpet

"This large rug on the wall is Persian, of the seventeenth century. A king who loved his garden had a design made of it in jewels so that he might look upon it during the winter when the snow covered the ground; and this design was later used in rugs. You will notice a central pool, from which brooks flow in four directions with flowers planted on their banks and in large beds alternating with the oriental planes about the pool, under which the king sat with his wise men and poets while the singing birds in the branches overhead told him the secrets of the universe. A larger brook in the center is bordered with two rows of cypress trees with flowers between them."

Case 5

Plants: Marigold, lily, crocus, tulip, fern. The Fuchs Herbal, a book which has had an immense influence on decorative art.

Art Objects: Framed tile with marigolds; Minoan jar and votive vestment with lavender or blue crocuses; Minoan vase and a dagger with lilies; textiles and other objects.

"This case contains a number of beautiful objects. Nothing could be prettier than the use of the dainty crocus motive by the Cretans on jars and votive costumes and by the Copts on some of their wonderful textiles. This Minoan terra-cotta jar shows the 'spirit' of the lily to the very best advantage. The flower is not copied, but its outline and rhythm are adapted in a very pleasing way to the shape of the jar. Its use on the dagger blade seems rather strained, since the lily is an emblem of purity. The marigolds on the tile are quite naturalistically treated, but combined to some extent with a conventional pomegranate motive."

Case 6

Plants: Pomegranate flowers and foliage pressed and in colored figures, pomegranate fruit; peony plant and colored figures of tree-peony and the ordinary species.

Art Objects: Chinese wooden pillow of the Sung dynasty ornamented with tree peonies; Russian silver-gilt plate, gold chalice, Flemish bobbin lace, Asia Minor embroidery, Venetian velvet brocade, etc., using pomegranate flowers and fruits as motives. On the wall, a handsome strip of Spanish brocade with the same motive.

"The Chinese used the peony a great deal, as is well illustrated by that handsome wooden pillow; but the chief motive exhibited in this case is the pomegranate. This tree is a native of Persia, and its shapely and brilliantly colored flowers and fruits early attracted the decorative artist. The fruit was reproduced in ancient Egyptian and Assyrian sculpture, as for example in the relief from a memorial temple of Rameses I at Abydos, where it is associated with grapes and other fruits. The so-called 'pear motive' is a pomegranate fruit elongated in shape. The seeds were symbolic of eternal life. In the chalice, two plant motives were used, the top representing a cluster of foxglove flowers and leaves. What could be finer than that strip of Spanish brocade with its rich colors and superb pomegranate designs!"

Case 7

PLANTS: Two growing plants of English ivy and a vase of Ophelia roses.

ART OBJECTS: Chinese plate with wild roses, Asia Minor bowl with rose and cypress-almond motives, sepulchral vase of the third century B. C. with ivy ornamentation, and many others.

"Here again, in this wonderful bowl, we find the cypress-almond motive alternating with the peculiar rose which you have learned by this time to associate with Asia Minor and Persian designs. The buds and leaves of the rose are quite naturalistically treated.

"In this plate, one of the very finest pieces in the collection, the cypress and almond trees are kept distinct. This interesting sampler, with its puritanical maxim, would be more artistic if the rosebuds in the border were not quite so large. In the Coptic textile over the case, the rose is reduced to four petals—a very easy thing for the decorative artist to do—as is seen in some French designs. The motive used in the prayer rug near the door is said by some to be the rose, by others to be the pomegranate."

The Central Cases

PLANTS: Marguerite, English daisy, papyrus, living leaves of the true laurel; edelweiss, acorns, oak leaves, and, on the screen, olive leaves and flowers.

ART OBJECTS: Greek vases with laurel, olive, and palmette designs; Minoan jug and ornaments with daisies; laces with rose, lily, forget-me-not, pomegranate, carnation, sunflower, anemone, edelweiss, oak, daisy, and cherry designs; various other objects.

"Note the beauty of form and color in the daisy design on this Minoan jug, over three thousand years old, and compare it with the flowers on this marguerite plant. The olive was the symbol of plenty and the laurel signified success or victory. By comparing the true laurel leaves of southern Europe with those of our mountain laurel, you will notice some differences, but these were not sufficient to prevent the use of tons of the latter in welcoming our returning victorious troops.

"The remarkable hanging over the door is not tapestry, but embroidery, and the woman who made it must have spent a lifetime. It is a seventeenth-century Italian altar front representing a formal garden, the pots of tulips and the angels with golden harps being made separately and stitched on. Notice the excellent perspective and well-preserved colors. Careful scrutiny will reveal many different kinds of trees, flowers, birds, and other objects used as motives in this truly wonderful piece of work.

"One of the most interesting and graceful plants in the room is the papyrus. It was probably introduced into Egypt from Nubia and became so abundant and important there that it was chosen as the emblem of Lower Egypt, as the lily was the floral emblem of Upper Egypt. When these two districts became united under Menes, the first historical king of Egypt, the floral emblems were blended, as was done with the red and white roses in England.

"The uses of the papyrus, now unfortunately extinct in the valley of the Lower Nile, were many and varied; the large, strong roots, as well as the slender leafstalks, replacing wood for many purposes, while the pith was eaten and the branching leaf-tops were made into garlands for the shrines of the gods. But its most important use was in the manufacture of paper. The stalks were cut into thin strips and laid side by side on a board, with another layer of strips across them, and then soaked in river water until somewhat mucilaginous, when they were pressed and smoothed into sheets of paper, the finest of which were called *hieratica*. Here is one of these sheets, covered with ancient hieratic characters.

"The papyrus was used by the Egyptians in design along with the lotus and palm, it being especially adapted to the shafts and capitals of columns. One of the most beautiful columns in the Museum is in the Egyptian section, upstairs, where you will see the papyrus and another related sedge used together to form a composite capital."

"Are those the bulrushes in which little Moses was hidden?" inquired one of the pupils.

"Yes; they are really sedges, their stems being triangular instead of circular in section, but fine distinctions like that do not count in popular language. They were commonly used in the construction of light boats for shallow waters, and they certainly grew tall enough to hide any human being."

Plants Used in Designs Exhibited

Acanthus
Almond
Anemone
Carnation
Cherry
Chrysanthemum
Crocus
Cypress
Daisy, two kinds
Edelweiss
Fern
Foxglove
Grape
Hepatica
Hyacinth
Iris
Ivy
Laurel
Lily
Lotus, two kinds
Marigold
Morning-glory
Narcissus, two kinds
Oak, two kinds
Olive
Palm
Papyrus
Passion-flower
Peony, two kinds
Pineapple
Pink
Planetree
Pomegranate
Poppy, three kinds
Rose
Seaweed
Sunflower
Thistle
Tulip, two kinds
Wheat

Other Plants and Plant Illustrations Exhibited

A large screen with 140 colored plates from *Addisonia*.

Another screen with 26 sketches of plants arranged in groups; also, on the reverse, 17 mounted specimens of seaweeds selected from the herbarium of the Garden.

A long table containing 28 vases of dried fruits and flowers; also several small living desert plants.

A small formal group of living plants on the floor between the screens, containing specimens of spurges and aloes.

Several tropical American plants of special texture, shape, or color, in various parts of the room, such as cryptanthus, vriesia, and calathea.

Fifty palms, some of large size, arranged in decorative groups about the room and in the corners.

A number of cultivated plants, common to Europe and America, which have furnished motives for design but are not represented by art objects.

A frame of colored illustrations of wild flowers.

A frame of colored illustrations of fungi.

Some Books on Plant Forms in Ornament

Clark, Ernest E. A handbook of plant form for students of design. London, 1905.

Colling, James K. Examples of English mediaeval foliage. London, 1874.

Day, L. F. Nature and ornament. London, 1908–09. 2 vols.

Goodyear, W. H. The grammar of the lotus. London, 1891.

Grasset, E. La plante et ses applications ornamentales. Paris. 2 vols.

Hulme, F. Edward. Plants, their natural growth and ornamental treatment. London, 1874.

Knight's Scroll ornaments. London.

Lilley & Wridgeley. Studies in plant form. New York.

Lindenberg, H. The acanthus leaf. New York.

Rankin, H. A., & Brown, F. H. B. Simple art applied to handiwork. Vol. 1. New York.

Schauermann, F. L. Theory and analysis of ornament. London, 1892.

Townsend, W. G. P. Plant and floral studies for designers, art students, and craftsmen. New York, 1901.

American Plants as Motives

"One of the chief objects of this exhibit is to direct attention to the wealth of American material available for use in decorative design. The old traditions have a powerful hold, but continued repetition is apt to become monotonous, like playing the same tune, however good it may be, over and over again. The normal human mind is ever demanding something new. Why not look to American plants for new ideas?

"The arbutus, bloodroot, twinflower, orchids, and other wild flowers of great beauty fill our temperate and tropical forests; vines like the smilax, honeysuckle, clematis, and climbing bittersweet, trail in profusion everywhere; while shrubs like the mountain laurel, sweet fern, sumac, and button-bush, and trees like the holly, sweet gum, and dogwood, are available to designers in many sections of our country.

"Our waters are also full of ideal patterns for various kinds of decoration, while the strange and infinitely varied forms of fungi that grow on the forest floor and on the trees themselves would yield many novelties to those in search of ideas.

"I would not have you entirely disregard the beautiful plant motives which have served mankind in the past. Nothing endures through the centuries but what is beautiful and good. As reading the best books cultivates our literary taste, so a study of the best styles of decorative art enables us to use intelligently and artistically the new ideas furnished by Nature. The innocent child, or the untutored savage, may discover many things that are novel and wonderful to him, but not essentially different from other primitive efforts. Knowledge is power, in any field, and it is quite necessary to the kind of originality that accomplishes good work.

"Let us, then, infuse new life into the old ideas, and on the old reliable stocks graft and grow new motives peculiar to a New World, where Nature has been very bountiful, as she always is to eyes that can see and hearts that can appreciate her beauties."

The two illustrations accompanying this record are from photographs taken by the photographer of the Metropolitan Museum.

During the exhibition the following public lectures on related subjects were delivered in Class-room A:

April 7. "Spring Flowers," by Dr. N. L. Britton.

April 14. "The Use of Plant Forms in Ornament," by Dr. A. D. F. Hamlin.

April 21. "Collection and Preservation of Seaweed," by Dr. Marshall A. Howe.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

STAPHYLEACEAE. Bladder-nut Family

Staphylea. BLADDER-NUT

Staphylea Bumalda. JAPANESE BLADDER-NUT.
Location: Fruticetum.
Natural distribution: Japan.

Staphylea colchica. CAUCASIAN BLADDER-NUT.
Location: Fruticetum.
Natural distribution: Caucasus.

Staphylea Coulombieri. COULOMBIER'S BLADDER-NUT.
Location: Fruticetum.
Natural distribution: Caucasus.

Staphylea holocarpa. NAKED BLADDER-NUT.
Location: Fruticetum.
Natural distribution: Central China.

Staphylea pinnata. PINNATE BLADDER-NUT.
Location: Fruticetum.
Natural distribution: Europe to western Asia.

Staphylea trifolia. AMERICAN BLADDER-NUT.
Location: Fruticetum. Wild, common.
Natural distribution: Northeastern North America.

ACERACEAE. Maple Family

Acer. MAPLE

Acer campestre. COMMON EUROPEAN MAPLE.
Location: Arboretum.
Natural distribution: Europe and western Asia.

Acer campestre var. **hebecarpum.** HAIRY-FRUITED EUROPEAN MAPLE.
Location: Arboretum.

Acer cappadocicum var. **rubrum.** RED-VEINED ORIENTAL MAPLE.
Location: Arboretum.

Natural distribution: Caucasus to western China and the Himalayas.

Acer circinatum. ROUND-LEAVED MAPLE.

Location: Arboretum.

Natural distribution: Western North America.

Acer Ginnala. GINNALA MAPLE.

Location: Fruticetum.

Natural distribution: Manchuria, northern China, and Japan.

Acer japonicum. HAIRY JAPANESE MAPLE.

Location: Fruticetum.

Natural distribution: Japan.

Acer japonicum var. **aureum.** GOLDEN HAIRY JAPANESE MAPLE.

Location: Fruticetum.

Acer japonicum var. **macrophyllum.** LARGE-LEAVED HAIRY JAPANESE MAPLE.

Location: Fruticetum.

Acer japonicum var. **Parsonsii.** PARSONS' HAIRY JAPANESE MAPLE.

Location: Fruticetum.

Acer leucoderme. WHITE-BARKED SUGAR MAPLE.

Location: Arboretum. Fruticetum.

Natural distribution: North Carolina to Georgia and Louisiana.

Acer macrophyllum. BROAD-LEAVED MAPLE.

Location: Arboretum.

Natural distribution: Southern Alaska to southern California.

Acer Miyabei. MIYABE'S MAPLE.

Location: Arboretum.

Natural distribution: Japan.

Acer monspessulanum. MONTPELIER MAPLE.

Location: Fruticetum.

Natural distribution: Southern Europe, northern Africa, and western Asia.

Acer Negundo. ASH-LEAVED MAPLE.

Location: Arboretum. North side of depot plaza. Opposite approach to Elevated Railway.

Natural distribution: Eastern North America.

Acer Negundo var. **auratum.** GOLDEN ASH-LEAVED MAPLE.
Location: Arboretum.

Acer Negundo var. **variegatum.** VARIEGATED ASH-LEAVED MAPLE.
Location: Arboretum.

Acer nikoense. NIKO MAPLE.
Location: Arboretum.
Natural distribution: Japan and central China.

Acer palmatum. JAPANESE MAPLE.
Location: Fruticetum.
Natural distribution: Japan.

Acer palmatum var. **atropurpureum.** PURPLE-LEAVED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **dissectum rubellum.** RED FERN-LEAVED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **Hessei.** HESSE'S JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **minus.** SMALL-LEAVED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **roseo-marginatum.** ROSE-MARGINED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **rubrum.** RED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **sanguineum.** BRIGHT-RED JAPANESE MAPLE.
Location: Fruticetum.

Acer palmatum var. **septemlobum.** SEVEN-LOBED JAPANESE MAPLE.
Location: Arboretum.

Acer palmatum var. **sinuatum.** NARROW-LOBED JAPANESE MAPLE.
Location: Fruticetum.

Acer pennsylvanicum. STRIPED MAPLE.
Location: Arboretum.
Natural distribution: Eastern North America.

Acer platanoides. NORWAY MAPLE.

Location: South side of depot plaza. Along path west of the Museum. Along road east of the Museum.

Natural distribution: Europe and Caucasus.

Acer platanoides var. **cucullatum.** HOOD-LEAVED NORWAY MAPLE.

Location: Arboretum.

Acer platanoides var. **dissectum.** CUT-LEAVED NORWAY MAPLE.

Location: Arboretum.

Acer platanoides var. **globosum.** ROUND-HEADED NORWAY MAPLE.

Location: Arboretum.

Acer platanoides var. **Reitenbachii.** REITENBACH'S NORWAY MAPLE.

Location: Arboretum.

Acer platanoides var. **Schwedleri.** SCHWEDLER'S NORWAY MAPLE.

Location: Arboretum.

Acer Pseudo-platanus. SYCAMORE MAPLE.

Location: Arboretum. Along path near fountain at foot of Museum approach. Along path north of Conservatory Range I.

Natural distribution: Europe and Caucasus.

Acer Pseudo-platanus var. **Leopoldii.** LEOPOLD'S SYCAMORE MAPLE.

Location: Arboretum.

Acer Pseudo-platanus var. **purpurascens.** PURPLE SYCAMORE MAPLE.

Location: Arboretum.

Acer rubrum. RED MAPLE.

Location: Arboretum. Wild, common.

Natural distribution: Eastern North America.

Acer rubrum var. **globosum.** ROUND-HEADED RED MAPLE.

Location: Arboretum.

Acer rufinerve. RED-NERVED MAPLE.

Location: Arboretum.

Natural distribution: Japan.

NOTES, NEWS AND COMMENT

Miss E. M. Kittredge, custodian of the lantern slide collection, left early in April for Woodstock, Vermont, where she will spend a part of the spring.

The Pacific Slope and adjacent Rocky Mountains are represented in a large collection of plants from British Columbia, Alberta, Washington, Oregon, and California, obtained by exchange with the Field Museum of Natural History.

Among recent visitors at the Museum Building were Dr. J. W. Harshberger, of the University of Pennsylvania, Dr. W. W. Tupper, of Newtonville, Mass., Mr. Wilbur A. Brotherton, of the University of Michigan, and Miss Minerva Hart, librarian of the public library, Port of Spain, Trinidad.

Short notes have been appearing in the daily press at frequent intervals during the past month, calling the attention of the public to special features of immediate interest in the greenhouses or on the grounds of the New York Botanical Garden. The notes have evidently been read by numerous persons, many of whom have visited the Garden as a result.

A collection of about twenty-two hundred miscellaneous specimens of flowering plants from various parts of the Philippine Islands has been received for the herbarium. This acquisition represents an important addition to our large series of Philippine plants, which is built up mainly of the collections of Mr. R. S. Williams, Dr. C. B. Robinson, and the various collectors of the Bureau of Science of the Philippine government.

Professor Kemp has recently found among other stored articles in the Department of Geology of Columbia University a notebook of the late Professor John Strong Newberry, containing notes in French taken by him while a student, and covering the lectures on Botany delivered by Professor Brongniart in Paris in 1849 and 1850. Through Professor Harper, Professor Kemp has transmitted this very interesting document to the Garden for preservation, and it has been added to the library.

Herbert Huntington Smith, curator of the Museum of the Geological Survey of Alabama since 1910, was killed by a freight train in Alabama on March 22. Professor Smith was very deaf and failed to hear the approaching train. Though best known as a collector in branches of natural science other than botanical in South America, Mexico, and the West Indies, Professor Smith once made a notable collection of plants in Colombia, the determinations of which were made chiefly by Dr. H. H. Rusby of the Garden staff.

Dr. P. A. Rydberg has again added to his published contributions on the flora of the Rocky Mountain region. His latest work bears the title "Key to the Rocky Mountain Flora," and is a reprint of the keys in his larger manual "Flora of the Rocky Mountains and Adjacent Plains." It is a neat little book of pocket size, printed on thin paper with narrow margins and bound in flexible red covers, and will be especially convenient for botanists and tourists who wish a compact portable book for field work.

Meteorology for February.—The total precipitation for the month was 2.80 inches of which 0.12 inches (1¼ inches snow measurement) fell as snow. The maximum temperatures recorded at the Garden for each week were *53° on the 3d*, 47° on the 13th, 49° on the 20th, and 50° on the 24th. The minimum temperatures were 20° on the 7th, *14° on the 11th*, and 20° on the 20th and 27th.

Meteorology for March.—The total precipitation for the month was 4.15 inches including 0.45 inches (4½ inches snow measurement) of snow. The maximum temperatures recorded at the Garden for each week were 61° on the 5th, 63° on the 13th, *69° on the 21st*, and 63° on the 25th. The minimum temperatures were 24° on the 7th, 26° on the 15th, 34° on the 23d, and *23° on the 30th.*

The site for the War Memorial plantation of Douglas Spruce, referred to in the January number of the JOURNAL, has been regulated and graded and path connections built to it during the

month of March, the mild weather having permitted operations which in ordinary seasons could not have been accomplished until April. The area selected is about one acre in extent on a gentle slope to the northeast, situated near the entrance to the Horticultural Garden on the Southern Boulevard. An old farm-road which traversed the area had to be broken up and many large rocks and boulders removed. The stone obtained in the grading work supplied all required for the Telford foundations of the paths, and an unsightly portion of the grounds has been greatly improved. Planting of the trees was commenced during the first week of April.

Mrs. Henry O. Taylor, one of the members of the Women's Auxiliary, has presented to the library of the Garden an unusually fine copy of Piso's valuable work on the natural history and medicine of the Indies (*De Indiae utriusque re naturali et medica*), published at Amsterdam by the famous printers Louis and Daniel Elzivir in 1658. More than half of the volume is occupied by Piso's own observations upon the animals and plants of Brazil during a residence of eight years (1637–44) in that country, and the work is a classic among those relating to the flora of eastern tropical South America. This copy is of particular interest because it was presented by the author to a friend, a young student of medicine, and bears an inscription to that effect in a beautifully clear hand, at the bottom of the engraved title-page, signed "G: Piso."

The fourth floor of the Museum Building at the Garden has been overcrowded as a result of the steady growth of the collections and library which are housed there, until it has become necessary to remove a portion of the collections to the floor below. The exhibition cases of the Systematic collection have been rearranged, vacating the west wing of the third floor. This wing has been partitioned off from the remainder of the floor and divided into three small rooms to be used as studies and a large room for the collections. The entire herbarium of thallophytes, except the lichens, is now housed in this room, while the studies are occupied by Dr. Murrill, supervisor of

public instruction, Dr. Howe, curator of algae, and Dr. Seaver, curator of fungi. Besides bringing together the thallophyte collections in one room and providing more comfortable quarters for the members of the staff primarily concerned with them, this rearrangement sets free about three thousand square feet of floor space on the fourth floor, which has been greatly needed for other purposes.

Some time ago the New York Botanical Garden received in exchange with the Field Museum of Chicago a number of herbarium specimens, among which was a set of duplicates from the collection of the late Dr. J. H. Schuette of Green Bay, Wisconsin. Dr. Schuette was an enthusiastic collector and knew the flora of northeastern Wisconsin very well. Unfortunately he published but little, so that his fellow-botanists did not fully appreciate the extent of his botanical investigations and observations. He was especially interested in the native species of roses and published one short article on them in volume 46 of the Proceedings of the American Association for the Advancement of Science, in which he proposed one new species and a dozen or more varieties. His descriptions were very short, comprising a line or two each, so that a student of the genus might be inclined from the mere reading of the article to discredit his work. But the collection of specimens now in the Garden herbarium and a similar one in the Gray Herbarium are both accompanied by copious notes by Dr. Schuette, which throw an entirely different light on his work. His new species is indeed very distinct, as is also a second unpublished species which he had held in manuscript. Most of his varieties, on the other hand, are apparently natural hybrids, and his notes show that he had regarded them as such even at the time of publication. Few American botanists, if any, have given such careful attention to our native hybrid roses as Dr. Schuette, although he did not choose to express his convictions publicly and described them as varieties.

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PUBLICATIONS OF THE STAFF, SCHOLARS AND STUDENTS OF THE NEW YORK BOTANICAL GARDEN DURING THE YEAR 1918

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CONFERENCE NOTES FOR FEBRUARY AND MARCH

The regular monthly conference of the staff and registered students of the Garden was held on the afternoon of February 5, 1919.

Dr. Marshall A. Howe discussed the North American species of *Liagora*, illustrating his talk by specimens, both dry and in fluid, and showing the microscopic structure of the plants by drawings. The following is an abstract of his remarks:

"*Liagora* is a genus of red algae, confined in its geographic distribution to the warmer seas, its species being found chiefly in water that is normally agitated. The speaker recognized ten species as occurring in North American waters, one of these being Californian and the other nine, including two about to be described as new, being found in the West Indian region, some of them ranging as far north as Bermuda. The original specimens or at least authentic material of all the species attributed to North America have been examined and as a result some reductions of names to synonymy have been made. Special attention has been given to the character and mode of distribution of the antheridia, important characters that hitherto have been rarely mentioned in the describing of species. Nothing has been found that could be certainly interpreted as tetraspores or as a non-sexual alternating generation bearing sporangia of any kind. However, at least four of the West Indian species often show minute flat orbicular discs lying on the general surface of the plant or somewhat immersed among the assimilatory filaments. The darker red color of these discs, their dorsiventral rather than radial symmetry, and the lack of any very obvious genetic continuity with the *Liagora* give plausibility to the first impression that they are independent organisms or perhaps obligate parasites of species of *Liagora*. But the truth seems to be that they arise from gonidia, gemmae, or aplanospores derived from the terminal or subterminal cells of the assimilatory filaments of the *Liagora*. This was the view of Kützing, who described and figured similar structures in a Red Sea species of *Liagora* as long ago as 1858, since which time nothing seems to have been added to our knowl-

edge of these curious bodies, and Kützing's observations appear to have been overlooked or ignored by subsequent writers on the genus."

The subject "Seed sterility in plants that reproduce vegetatively" was presented by Dr. A. B. Stout. The principal views as to the cause of such sterility were briefly presented and discussed and a report was made of some original research bearing on the phenomena.

Seed sterility has long been recognized as frequent and often complete for numerous species, both wild and cultivated, which are freely and naturally propagated by such vegetative organs as roots, tubers, bulbs or rhizomes. The view has very generally prevailed that in such cases the vegetative organs prevent the development of seeds by diverting and utilizing the food supply that is available. The vegetative organs, it is thought, obtain food at the expense of the structures of seed reproduction; an assumed relationship which has been called "compensation of growth" by Darwin and "quantitative correlation" by Goebel.

However, present day knowledge of seed sterility in plants that reproduce by seeds, or like the apple are propagated vegetatively by artificial grafting, shows that in many species fertility and sterility are relative and are to be ascribed to some element of physiological relation operating between the sex organs themselves. In such cases plants that are seed sterile to self-pollination are highly productive of seed in certain cross-relations. Also sister plants of identical vegetative habit grown under same conditions may be highly self-fertile. In order words, the fertility is relative.

Evidence is increasing to the effect that seed-fertility in plants which propagate vegetatively may be relative. Such experimental evidence consists in finding self-fertile plants along with self-sterile plants, or in finding that the "seed-sterile" plants will produce seed when properly crossed. In plants widely propagated vegetatively it is necessary to obtain a stock from a different seed source if one is to test most adequately intra-specific fertility.

Experimental studies bearing on this question have been under

progress at the Garden for a number of years. The results with species of *Hemerocallis* may be reported here. Two species of this genus are well-known garden plants. One has lemon-colored flowers (*Hemerocallis flava*) and one has orange flowers (*H. fulva*). The literature for *H. flava* shows that some plants are self-fertile and others are self-sterile. It appears, however, that *H. fulva* has never been known to produce fruit and seeds. Even the oldest references either make no mention of pods or state that they are not formed.

Plants of *H. flava* growing at the New York Botanical Garden were found to be highly self-fertile; plants of *H. fulva* were completely sterile to all self-pollination and to intra-varietal cross-pollination. A third species, *H. Thunbergii*, was found to be feebly or partially fertile to self-pollination. Pollen of *H. fulva* applied to pistils of *H. flava* led to the production of pods and viable seeds, but the reciprocal cross failed. Pollen of *H. Thunbergii* was applied to a large number of pistils of *H. fulva* and two pods with seeds were obtained.

The three species are quite alike in vegetative habit and the results thus far obtained suggest that the seed-sterility in evidence is due to physiological incompatibility operating between organs of reproduction rather than to purely nutritive relations operating between organs of vegetative reproduction on the one hand and fruit and seed structures on the other. This is especially clear in the case of *H. flava*. It is however possible that both conditions are operating.

The results obtained with species of *Hemerocallis* were illustrated by photographs and by pods obtained in the experiments.

A conference of the scientific staff and the registered students of the Garden was held on the afternoon of March 5. Mrs. Britton exhibited the collections of mosses belonging to the New York Botanical Garden from the Bahamas made on the explorations which were begun in April, 1904. These collections include about fifty sheets and two hundred specimens, which are referable to fourteen families, twenty-seven genera and thirty-five

species, of which thirty-one species also occur in Florida and eight in Bermuda. Only one of these is apparently undescribed and endemic, *Hymenostomum flavescens;* two are extensions of range southward, *Desmatodon Garberi*, which has heretofore only been known in Florida, and *Schlotheimia Sullivantii;* four are extensions of range northward of the following West Indian and South American species, *Fissidens monandrus*, *F. radicans*, *Syrrhopodon Gaudichaudii*, and *Trichostomum rivale;* four are cosmopolitan, *Funaria hygrometrica* and *F. flavicans*, *Bryum capillare*, and *B. coronatum*. Reference was made to the fact that New Providence is the type locality for *Octoblepharum albidum*. Descriptions will appear in the Flora of the Bahamas, now in press. Keys to the families were exhibited.

Comment and discussion was stimulated by the fact that twelve of the thirty-five species are only known from sterile specimens, which apparently are maintaining a precarious existence, as five of them are propagating only by brood-bodies, while several others are distributed by brittle stems, branches, or leaves. Dr. Harper made the point that these were all offshoots from the gametophyte and Mrs. Britton replied that in several mosses, notably *Hyophila riparia*, where the paraphyses surrounding the undeveloped archegonia produced propagulae and in one case of *Octodiceras Juilana*, where the calyptra gave rise at apex to the protonema, these vestigial organs derived from the gametophyte were carried over with the sporophytic stage.

Mr. R. S. Williams reported on "The Genus *Desmatodon* in North America and southward to Colombia and the West Indies." The work on this genus was mostly done some four or five years ago, and but little has since occurred to cause any important changes. Twelve species are now included in the genus as against thirteen in the Lesq. & James' Manual, but two of these thirteen species, *D. neomexicanus* and *D. nervosus* belong to *Tortula* while one other, *D. arenaceus* is reduced to *D. obtusifolius*. This leaves ten of the Manual species, the two additions being *D. Sprengelii*, originally from Santo Domingo and discovered in Florida in 1916 by Dr. Small, and *D. stomatodonta* from Jalisco, Mexico.

Desmatodon Bushii Card. & Ther. from Missouri belongs to *Tortula, fide* Brotherus. *D. Sartorii* (C.M.) Paris, from Mexico, is a *Leptodontium* and *D. systylioides* Ren. & Card. from Newfoundland a *Pottia*.

As here constituted the species of *Desmatodon* have leaves broad in the upper half, sometimes even slightly spatulate, the leaf-margins flat or revolute, without border or with a colored or thickened border of two layers of cells and costa in cross-section showing a single stereid band below the 2 to 4 mostly large guide-cells. The capsule is annulate, the 16 teeth of the peristome densely papillose and more or less divided into 2 or 3 forks sometimes very irregular. The type species is *Dicranum latifolium* of Hedwig.

A. B. STOUT,
Secretary of the Conference

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

Acer saccharinum. SILVER MAPLE.

Location: Near Power House 1. Along road south of Museum.

Natural distribution: Eastern North America.

Acer saccharinum var. **Weiri.** WEIR'S MAPLE.

Location: Arboretum.

Acer Saccharum. SUGAR MAPLE.

Location: Arboretum. Wild, common.

Natural distribution: Eastern North America.

Acer Saccharum var. **monumentale.** UPRIGHT SUGAR MAPLE.

Location: Arboretum.

Acer tataricum. WHITE-FLOWERED MAPLE.

Location: Arboretum. Fruticetum.

Natural distribution: Southeastern Europe and the Orient.

AESCULACEAE. Horse-chestnut Family

Aesculus. HORSE-CHESTNUT

Aesculus carnea. RED-FLOWERED HORSE-CHESTNUT.

Location: Arboretum.

Horticultural origin.

Aesculus glabra. OHIO BUCKEYE.

Location: Arboretum.

Natural distribution: South Central United States.

Aesculus Hippocastanum. COMMON HORSE-CHESTNUT.

Location: Arboretum. Along path from 200th Street entrance to elevated approach. Triangle near Herbaceous Grounds.

Natural distribution: Northern Greece and Bulgaria.

Aesculus Hippocastanum var. **Baumanni.** DOUBLE-FLOWERED WHITE HORSE-CHESTNUT.

Location: Arboretum.

Aesculus octandra. SWEET BUCKEYE.

Location: Arboretum.

Natural distribution: Southeastern United States.

Aesculus parviflora. SMALL-FLOWERED BUCKEYE.

Location: Fruticetum. West border, near upper end of upper lake.

Natural distribution: Southeastern United States.

Aesculus Pavia. RED BUCKEYE.

Location: Arboretum.

Natural distribution: Southeastern United States.

Aesculus turbinata. JAPANESE HORSE-CHESTNUT.

Location: Arboretum.

Natural distribution: Japan.

SAPINDACEAE. Soapberry Family

Koelreuteria. VARNISH TREE

Koelreuteria paniculata. VARNISH TREE.

Location: Arboretum. Along path south of Museum.

Natural distribution: Japan, Corea, and China.

Xanthoceras. XANTHOCERAS

Xanthoceras sorbifolia. XANTHOCERAS.

Location: Fruticetum.

Natural distribution: Northern China.

RHAMNACEAE. Buckthorn Family

Paliurus. CHRIST'S THORN

Paliurus Paliurus. CHRIST'S THORN.
Location: Fruticetum.
Natural distribution: Southern Europe and western Asia.

Zizyphus. JUJUBE

Zizyphus Zizyphus. JUJUBE.
Location: Fruticetum.
Natural distribution: Mediterranean Region and temperate Asia.
Zizyphus Zizyphus var. **inermis.** SPINELESS JUJUBE.
Location: Fruticetum.

Rhamnus. BUCKTHORN

Rhamnus alpina. ALPINE BUCKTHORN.
Location: Fruticetum.
Natural distribution: Southern Europe.
Rhamnus cathartica. PURGING BUCKTHORN.
Location: Fruticetum.
Natural distribution: Europe and western and northern Asia.
Rhamnus dahurica. DAHURIAN BUCKTHORN.
Location: Fruticetum.
Natural distribution: Central Asia to Amur Region.
Rhamnus Frangula. ALDER BUCKTHORN.
Location: Fruticetum. Economic Garden.
Natural distribution: Europe, northern Africa, western Asia, and Siberia.
Rhamnus Pallasii. PALLAS'S BUCKTHORN.
Location: Fruticetum.
Natural distribution: Transcaucasia to Armenia and northern Persia.
Rhamnus utilis. USEFUL BUCKTHORN.
Location: Fruticetum.
Natural distribution: Central and eastern China.

Ceanothus. CEANOTHUS

Ceanothus americanus. NEW JERSEY TEA.
Location: Fruticetum. Economic Garden.
Natural distribution: Eastern North America.

VITACEAE. Grape Family

Vitis. GRAPE

Vitis cordifolia. FROST GRAPE.
Location: Viticetum.
Natural distribution: Eastern United States.
Vitis Labrusca. NORTHERN FOX GRAPE.
Location: Viticetum.
Natural distribution: Eastern United States.
Vitis palmata. MISSOURI GRAPE.
Location: Viticetum.
Natural distribution: Illinois to Arkansas.

Parthenocissus. PARTHENOCISSUS

Parthenocissus quinquefolia. VIRGINIA CREEPER.
Location: Wild, common.
Natural distribution: Eastern North America, Mexico, Cuba, and the Bahamas.
Parthenocissus tricuspidata. JAPANESE IVY.
Location: Approach to Elevated Railway. 204th Street Bridge.
Natural distribution: Japan and central China.
Parthenocissus tricuspidata var. **Lowii.** LOW'S JAPANESE IVY.
Location: Viticetum.

Ampelopsis. AMPELOPSIS

Ampelopsis aconitifolia. ACONITE-LEAVED AMPELOPSIS.
Location: Viticetum.
Natural distribution: Northern China.
Ampelopsis heterophylla. VARIOUS-LEAVED AMPELOPSIS.
Location: Viticetum.
Natural distribution: Eastern Asia.

Ampelopsis humulifolia. HOP-LEAVED AMPELOPSIS.

Location: Viticetum.

Natural distribution: Northern China.

TILIACEAE. Linden Family

Tilia. LINDEN

Tilia americana. AMERICAN LINDEN.

Location: Arboretum. Along path west of Museum. Along approach to the Mosholu Bridge.

Natural distribution: Eastern North America.

Tilia cordata. SMALL-LEAVED LINDEN.

Location: Arboretum.

Natural distribution: Europe.

Tilia euchlora. CRIMEAN LINDEN.

Location: Arboretum.

Natural distribution: Orient.

ACCESSIONS

MUSEUMS AND HERBARIUM

23 specimens of flowering plants from Washington. (By exchange with the Field Museum of Natural History.)

1 specimen of *Cheilanthes Eatoni* from Oklahoma. (By exchange with Mr. B. F. Bush.)

1 specimen of the wood of *Amyris balsamifera* from Puerto Cabello, Venezuela. (Given by Mr. C. H. Pearson.)

1 specimen of *Petriphytum caespitosum* from Arizona. (Given by Miss Delia W. Marble.)

10 colored lantern slides. (By purchase.)

713 specimens of flowering plants from the western United States. (By exchange with the California Academy of Sciences.)

1 specimen of *Bjerkandera fumosa* from France. (By exchange with G. W. Martin.)

1 specimen of *Corticium effuscatum* from New York. (By exchange with Dr. W. H. Ballou.)

2 specimens of fungi from California. (By exchange with Professor H. E. Parks.)

1 specimen of *Bjerkandera fumosa* from Utah. (By exchange with Professor A. O. Garrett.)

27 specimens of *Phyllosticta* from Wisconsin. (Given by Dr. J. J. Davis.)

533 specimens of fungi from Porto Rico. (Collected by Professor H. H. Whetzel and Dr. E. W. Olive.)

118 specimens of flowering plants from Alberta, British Columbia, and Oregon. (By exchange with the Field Museum of Natural History.)

1 specimen of *Corticium phyllophilum* from New York. (By exchange with Dr. W. H. Ballou.)

70 colored lantern slides. (Given by Mrs. N. L. Britton.)

131 specimens of flowering plants from Colombia. (Given by Dr. M. T. Dawe.)

1 specimen of *Conopholus americana* from Florida. (By exchange with the University of Florida.)

10 specimens of barley, rye, and buckwheat for the economic museum. (By exchange with the Bureau of Plant Industry.)

30 uncolored lantern slides. (Given by Mrs. N. L. Britton.)

135 specimens of flowering plants from Oregon. (By exchange with the Field Museum of Natural History.)

LIBRARY ACCESSIONS FROM FEBRUARY 1 TO APRIL 21, 1919

ARNAUD, G. *Les Astérinées.* Montpellier, 1918. (Given by the author.)

Board of education of the city of New York. Minutes of the committee on special schools. 1908. (Given by Mr. Percy Wilson.)

BOERKER, RICHARD HANS DOUAI. *Our national forests.* New York, 1918. (Given by Mrs. N. L. Britton.)

BRACKENRIDGE, WILLIAM D. *Atlas. Botany. Cryptogamia. Filices* [of the Wilkes expedition.] Philadelphia, 1855.

CASE, MARY. *Paintings of wild flowers.* 2 vols. (Given by Mr. Eckstein Case.)

The Century dictionary. Vols. 1–6. New York, 1889–91. (Given by Miss E. M. Kittredge.)

COULTER, JOHN MERLE. *Plant relations; a first book of botany.* New York, 1900. (Given by Miss E. M. Kittredge.)

DANA, FRANCES THEODORA. *How to know the wild flowers.* New ed., 1897. (Hand illuminated by Miss Mary Case; presented by Mr. Eckstein Case.)

EGLESTON, NATHANIEL HILLYER. *Hand-book of tree-planting.* New York, 1884. (Given by Miss E. M. Kittredge.)

ELY, HELENA RUTHERFURD. *A woman's hardy garden.* New York, 1905. (Given by Miss E. M. Kittredge.)

Floral poesy. London, n. d. (Given by Miss E. M. Kittredge.)

GOODALE, GEORGE LINCOLN. *Concerning a few common plants.* Ed. 2. Boston, 1903. (Given by Miss E. M. Kittredge.)

HALE, GERTRUDE ELISABETH. *Little flower people.* Boston, 1887. (Given by Miss E. M. Kittredge.)

HOOPER, LUCY. *The lady's book of flowers and poetry.* New York, 1859. (Given by Miss E. M. Kittredge.)

ILDREWE, MISS. *The language of flowers.* Boston, 1865. (Given by Miss E. M. Kittredge.)

ITO, KEISUKÉ. [*The description of natural products of Japan.*] 3 vols. [Tokyo] n. d. (Given by American Museum of Natural History.)

ITO, KEISUKÉ. [*The illustrations and descriptions of Japanese flora.*] Vol. 1. [Tokyo, 1874]. (Given by American Museum of Natural History.)

JOHNSON, DUNCAN STARR. *The fruit of Opuntia fulgida; a study of perennation and proliferation in the fruits of certain Cactaceae.* Washington, 1918. (Given by Dr. N. L. Britton.)

MILLER, LEO EDWARD. *In the wilds of South America.* New York, 1918.

PACK, CHARLES LATHROP. *The war garden victorious.* Philadelphia, 1919.

PISO, WILLEM. *De Indiae utriusque re naturali et medica libri quatuordecim.* Amstelaedami, 1658. (Given by Mrs. Henry O. Taylor.)

SMALL, JOHN KUNKEL. *Ferns of Royal Palm Hammock.* New York, 1918. (Given by Dr. J. K. Small.)

THORBURN, GEORGE C. *Catalogue of kitchen garden, herb, flower, tree and grass seeds . . . gardening, agricultural, and botanical books . . .* New York, 1838.

VRIES, HUGO DE. *Opera e periodicis collata.* Vol. 2. Utrecht, 1918.

NOTES, NEWS AND COMMENT

Ground was broken April 14 for the new coal bunkers in connection with Power House no. 1. The roof will be constructed of reinforced concrete. They will increase the storage capacity at this power house to about 800 tons of coal. The earth removed in the excavation is being used to fill depressions near the Horticultural Grounds.

Dr. J. K. Small, head curator, left April 22 for a collecting trip in Florida under the patronage of Mr. Charles Deering. He will devote a considerable portion of his time to a continuation of his studies on the Florida cactuses.

Each year of growth adds to the beauty of the Japanese Cherry collection. The first species, *Prunus subhirtella,* was in full bloom by April 15, and other species followed for three weeks. The display attracted thousands of visitors.

During the severe blizzard early in April, the temperature reached a minimum of 21° and remained below the freezing-point for over twenty-four hours consecutively. Fortunately, little damage was done to the Garden plants except to some whose flowers had already opened. Practically all the flowers of the early-blooming honeysuckles, possibly three fourths of the Forsythia flowers, and a half of the magnolias blossoms were blighted. Nevertheless, the unopened buds were so well protected by their natural coverings that they were entirely uninjured and later developed normal flowers.

The first lectures of this year for school children were given at the Garden on April 23, 25, 29, 30 and May 2, by Dr. H. H. Rusby, Dr. F. J. Seaver, Dr. W. A. Murrill, Mr. George V. Nash, and Dr. M. A. Howe. The lectures were followed by demonstrations from the living plants.

The following visiting botanists have recently registered in the library: Professor John W. Harshberger, Philadelphia, Pa.; Dr. J. N. Rose and Mr. C. L. Shear, Washington, D. C.; Mr. Mel T. Cook, New Brunswick, N. J.; Mr. C. Billington, Detroit, Mich.; Professor M. Kanda, Hiroshima, Japan; and Dr. E. A. Gaumann, Bienne, Switzerland.

Dr. Neil E. Stevens, of Washington, D. C., spent two weeks at the Garden in April, engaged in bibliographical work in the library.

Professor Leroy Abrams, of Leland Stanford Jr. University, spent five weeks at the Garden in April and May, engaged in research on the flora of the Pacific coast. Professor Abrams is now preparing an Illustrated Flora of the Pacific States, of which volume one is practically finished.

Construction of new paths, mentioned in the February issue of the Journal, has been continued. The path from the Boulder Bridge through the arboretum to a point near the propagating houses has been completely surfaced with ashes and provides a long-needed connection. Work is now going forward on the path which will ultimately connect the rose-mallow garden with the iris garden.

The annual spring inspection of the Garden was held Thursday afterboon, May 1. The customary tour of the grounds and buildings was interfered with by rain, and the visitors spent most of their time indoors, where short talks were made by Dr. W. Gilman Thompson, Dr. N. L. Britton, and Dr. H. A. Gleason. A special feature of the day was the unveiling of a tablet in the new glass-houses, now approaching completion, at Range 2.

The tablet bears the inscription "This greenhouse was given by Daniel Guggenheim and Murry Guggenheim, 1917–1918, The New York Botanical Garden."

Among recent additions to the herbarium are a valuable collection of specimens from California and neighboring states, collected by Miss Alice Eastwood, curator of the California Academy of Sciences, and sent in exchange from that institution, and an interesting series of the earlier collections of Mr. John Macoun from Canada.

Mrs. E. G. Britton has given two of the Stokes' Wild Flower Preservation lectures, one before the Garden Club of Trenton, New Jersey, as the guest of Mrs. Karl Roebling, on April 3, and the other at the Larchmont Garden Club on April 7. The New Rochelle Garden Club made a special request for a lecture on the New York Botanical Garden, and Miss Kittredge prepared for it some new colored slides of Professor Anderson's exploded grains, which were discovered in the Garden laboratories.

On the afternoon of Wednesday, April 23, after a succession of warm sunny days, the lakes north of the Museum building were most attractive. Willows, poplars and sugar maples gave here and there a brilliant bright-green note to the brown woods; birches dangled their long catkins in the breeze; the high-bush blueberries cast red reflections in the water; cat-tails and sweet flags were pushing out of the mud; lilies had just reached the surface and were beginning to unfold their coppery red leaves. In the tall sweet-gums and button-woods the red-winged blackbird was calling its shrill trilling note; kingfishers noisily chased each other up and down the river; a muskrat sat up on the bank nibbling some fresh green plants; and a small blue-gray heron sat calmly on a branch sound asleep, evidently resting after a long journey. Flycatchers and warblers darted about, and in quiet secluded corners the chewinks and thrushes were foraging. High up in the top of an ash, that melodious songster, the brown thrasher, was softly practising his repertoire, getting ready for

the arrival of his mate, and the swallows were skimming the lake. But best of all, five wood ducks were seen calmly feeding and swimming about a short distance from the paths. The white markings of the head and the crest of the males were plainly visible.

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BRACKENRIDGE AND HIS BOOK ON FERNS.

William D. Brackenridge was born at Ayr, Scotland, June 10, 1810. In his youth he was trained as a gardener, and was in charge of Dr. Patrick Neill's grounds at Canonmills, Edinburgh. He then spent several years on the Continent, part of the time on an estate in Poland and the rest studying under Garden-director Friedrich Otto at Berlin. His knowledge of the German language, acquired during these years, proved of much value to him in his later travels. About 1837 he came to America, and entered the employ of Robert Buist of Philadelphia, the famous nurseryman. In 1838 a great opportunity presented itself to collect and study plants in fields rarely visited by the botanist, and he seems to have seized it with avidity.

For several years the United States government had been planning to send out a scientific expedition for the exploration of the Pacific. The plans were at first rather chaotic, and there were changes in commanders, alterations in the personnel of the scientific staff, and delays in the selection of vessels and the collection of supplies. As early as the summer of 1836, Asa Gray was slated as botanist of the expedition, and William Rich as assistant botanist. Nearly all arrangements for sailing had been completed in November, 1837, when the commander, Captain Jones, was taken sick. In the following year the command was transferred to Charles Wilkes, who entirely reorganized the work and conducted it in a masterful way until its completion. In July, 1838, Gray tendered his resignation, which was

accepted several weeks later; Rich was advanced to the post of botanist, and almost on the eve of sailing Brackenridge was designated as horticulturist and assistant botanist.

As finally made up, the fleet of the United States Exploring Expedition comprised six sailing vessels: two sloops-of-war, a store-ship, a gun-brig, and two tenders. During the voyage of nearly four years, two were lost, one was sent home, and one sold, only two of the six making the entire trip. Twelve civilians constituted the scientific corps. Three of these were particularly interested in botany, and devoted their time chiefly to the collection and study of plants. These three were Charles Pickering, one of the two "naturalists," William Rich, "botanist," and Brackenridge, who is sometimes styled "assistant botanist" and sometimes "horticulturist."

The different vessels of the expedition did not always keep together; indeed, sometimes one of them made a voyage under special orders to some part of the Pacific never visited by the rest, so that it is impossible to trace the track of the "expedition" as a whole. Most of the members of the scientific corps, however, were attached to the Vincennes, which was the largest vessel and the flag-ship of the little fleet; Rich, with one of the artists, Alfred T. Agate, who was particularly engaged in making drawings of living plants, spent the first year with the store-ship Relief.

The expedition finally, sailing from Hampton Roads, left the shores of the United States August 19, 1838, Brackenridge being with Pickering on board the Vincennes. Crossing the Atlantic, the first stop was one of about a week at Madeira, where Brackenridge did his first collecting. Recrossing the Atlantic to Rio de Janeiro, the Vincennes lay at anchor in the harbor there for about six weeks; during this time Brackenridge was able to devote considerable time to the study of the peculiar flora of the Organ Mountains. Leaving Rio on the seventh of January, 1839, the Vincennes proceeded southward along the coast, anchoring for about a week off the mouth of the Rio Negro, where several landing parties visited the shore, and finally doubling Cape Horn, in exceptionally fine weather, on the sixteenth of

February. Just after passing the Cape, the Vincennes anchored in Orange Harbor, and here Pickering and Brackenridge transferred to the Relief, where Rich already had his quarters.

The Relief left Orange Harbor February 26, 1839, sailing slowly up the Chilean coast, but not effecting a landing until arrival at Valparaiso, April 15. During the two weeks' stay at this port, Brackenridge collected along the coast north of the city, and as far inland as Santiago. Leaving Valparaiso on the first day of May, the Relief arrived at Callao on the twelfth. During the latter half of the month, a considerable party, including Pickering, Rich, and Brackenridge, penetrated the interior to and a short distance beyond the divide. All of June and a part of July was spent in the vicinity of Lima.

The Vincennes, to which Pickering and Brackenridge had again transferred themselves (Rich changing to the other sloop-of-war, the Peacock, as the Relief returned home from Callao), sailed westward, out into the Pacific, from Callao, July 13, 1839. Her course lay through the Low Archipelago to Tahiti and thence past Bellinghausen and Rose islands to the Samoan group, sending out parties to the shore at various islands on the way. Nearly three weeks in September were spent in the Tahitian group, and a month, from October 8 to November 10, among the Samoan Islands, upon several of which Brackenridge collected plants. From Samoa, the Vincennes sailed westward, then southward between the Fiji Islands and New Caledonia, and arrived at Sydney, New South Wales, about the end of November, 1839.

The day after Christmas the Vincennes left Sydney for the cruise during which the Antarctic continent was discovered, and, returning to Sydney, sailed thence to the Bay of Islands, near the northern end of New Zealand, and northward to the Fiji Islands. Some three months were spent in this group, from early May until nearly the middle of August; Brackenridge collected on several of the islands. Leaving Fiji and sailing northward through the Phoenix Islands, over a very zigzag course due largely to uncertain weather conditions, the Vincennes came in sight of the Hawaiian Islands on the 20th of September, and on the 24th cast anchor in the harbor of Honolulu. It was more

than six months later, April 6, 1841, that the Vincennes left Hawaii for the northwest coast of America, and these islands supplied a rich harvest to the botanists of the expedition.

The expedition arrived off the bar at the mouth of the Columbia River late in April, 1841, and proceeded north along the coast, entering Puget Sound about two weeks later, and this remained the headquarters for several months. Brackenridge, with Pickering, accompanied a party into the interior, under the command of Lieut. Johnson. This party proceeded in a general easterly direction across what is now the center of the state of Washington as far as Lapwai in Idaho, and returned by a more southern route, through Walla Walla, up the Yakima River, and over the mountains to the headquarters at Fort Nesqually. Upon the return of this party, Brackenridge accompanied Mr. Eld on his survey of Gray's Harbor, going down the Chehalis River. The trip into the interior and that to Gray's Harbor, each of about six weeks' duration, occupied the entire summer; and early in September Brackenridge, with Rich and severa other members of the scientific corps, joined Lieut. Emmons' overland party to San Francisco, while the sqadron sailed down the coast to the same place. The overland party went up the Willamette River, and through the Umpqua and Shasta regions to the headwaters of the Sacramento River, which was followed to its mouth. It was on this trip, near Mt. Shasta, that Brackenridge, who had dropped behind the rest of the party and was hurrying to rejoin them, hastily gathered an odd-looking plant that had attracted his attention. It was the fifth of October (1841, not 1842 as has been stated erroneously in all accounts of the discovery of this plant), and the season for flowers was long past, but the specimen was sufficient to show evident relationship to the group of pitcher-plants known, then and now, only from east of the Rocky Mountains. Not until nearly ten years later, in May, 1851, was this California pitcher-plant collected, in the same vicinity, in flower, so that it was possible to give a correct scientific description of the genus *Darlingtonia*, or, as it is now known, *Chrysamphora*.

The members of the scientific corps were finally all re-united

on board the Vincennes in San Francisco bay (the other sloop-of-war, the Peacock, had been wrecked during July in the Puget Sound region), and the expedition set sail again on the first day of November, 1841. The route lay westward across the Pacific, with a stop of about a week in Hawaii, through the Ladrones to the Philippines. While the Vincennes was at Manila, from the 13th to the 21st of January, 1842, the naturalists were often on shore, and Rich and Brackenridge were members of a party that set out to visit Taal volcano, then in eruption, but they failed to reach their destination.

From Manila, the Vincennes sailed by way of the Sulu Archipelago to Singapore, the Cape of Good Hope, the island of St. Helena, and home, arriving at New York on the ninth of June, 1842, nearly four years after the departure from the coast of Virginia. The expedition had accumulated vast collections in various departments of natural history, but the government had made no adequate provision for their care. For a few years they were intrusted to the National Institute, in Washington, then transferred to the Patent Office, and finally to the Smithsonian Institution, forming the nucleus of the National Museum of today. In a preliminary summary of the results of the expedition published shortly after its return, it is stated that about ten thousand species of plants were collected, from three to five specimens of each, and that about one hundred living plants and many seeds were brought back safely.

The organization of the Exploring Expedition was maintained for many years, with Wilkes still in charge, while the results of the cruise were being prepared for publication. The Library Committee of Congress was placed in charge of the publication of the results. To Brackenridge was assigned the preparation of the manuscript relating to ferns, but he was also in charge of the collections of living plants and seeds, and this horticultural work occupied so much of his time that he had little left for literary effort.

The first season, Brackenridge had at his disposal a greenhouse erected for the purpose on the lot behind the Patent Office; the building was about 50 feet long, partitioned into two apartments.

He reported that he had in cultivation about 500 species, not counting seedlings, and that 254 species of living plants had been brought home by the expedition. During 1843 and 1844 the greenhouse was enlarged to at least three times its original size. The living plant collections remained here until 1850, when the erection of a new wing of the Patent Office necessitated their removal, and new conservatories were erected on the Mall, immediately in front of the Capitol. Brackenridge remained in charge of these new greenhouses as long as they remained under the supervision of Captain Wilkes; that is, until the summer of 1854.

The publication of the volumes containing reports of the results of the expedition was planned on a magnificent scale, carried out in a desultory fashion, and seriously interrupted by the civil war. Finally, in 1876, although still far from completion, publication was definitely suspended; this was due chiefly to the reckless manner in which appropriations had been squandered, comparatively little of the money being used for the purpose for which it was intended. Each volume was issued by the government in an edition of 100 copies, sumptuously bound, and distributed gratuitously to the state libraries of each state of the Union and to the national libraries of certain foreign countries. No copies of this government edition were offered for sale to the public, but each author was permitted to have additional copies printed at his own expense, and to sell or give them away at his own discretion.

Brackenridge was a good field-botanist, with the advantage of four years of intimate association during the voyage with the scholarly Pickering; and he was by no means illiterate. That he could write English clearly and fluently is proven by his letters still in existence. But he was not well versed in the technical forms of descriptive plant taxonomy, and his knowledge of Latin was very limited. The rules laid down for the monographs of the report series demanded that every description should be printed in both Latin and English, and Brackenridge appealed to Professor John Torrey, of Princeton, to help him out of his difficulty. Torrey revised much of the fern manuscript, supply-

ing Latin translations as he went along; for some unexplained reason, however, Wilkes required Brackenridge to demand the return of the manuscript in July, 1851, and subsequently it was placed in the hands of Dr. Asa Gray, who completed the preparation of the work for the press. From his letter of December 7, 1853, to Engelmann, one would suppose that Gray was responsible for all that there is of value in Brackenridge's masterpiece, but this is certainly far from true. Even the Latin translations were not all Gray's work; unless, indeed, Torrey's notes were not made available to him, and he was compelled to do all of his work without their assistance.

Brackenridge's report on "Filices, including Lycopodiaceae and Hydropterides," constituting vol. 16 of the expedition series, after many vexatious delays, at last made its appearance. It was issued in two parts, a quarto volume of text, dated 1854, and a folio volume of plates, dated 1855. Early in 1856, a fire in Washington destroyed about one fifth of the sets of the government edition published up to that time, including the volumes dealing with ferns. It is not known exactly how many copies Brackenridge had printed for his own use; but it matters little, for at about the same time that the government supply was so seriously reduced, his own was wiped out by a fire in Philadelphia, after only ten copies had been sold, most of these to customers in Europe. It is no wonder then, as is well known, that the Brackenridge volumes are the scarcest in the Exploring Expedition set. The New York Public Library contains a copy of the text; but the folio atlas, with its 46 beautiful plates, seems to be even rarer, and was not to be found in any of the great libraries of New York City, until a copy was recently secured by purchase for the library of the New York Botanical Garden.

In the spring of 1855, Brackenridge purchased a tract of 30 acres near Baltimore, Maryland, with buildings, and here he spent the remainder of his life. As nurseryman and landscape architect he took an important part in the development of many beautiful estates in the vicinity of Baltimore. For some years he was horticultural editor of the *American Farmer* but his one book was his only contribution of importance to botanical literature. His death occurred on the third of February, 1893.

Brackenridge's modesty was so excessive that he could never be induced to furnish biographical information to those who sought to secure it directly from him as the most authoritative source, and the world is indebted to the late Thomas Meehan for the preservation of not a few of the facts of this interesting career. Meehan published an account of Brackenridge, with a portrait, in the number of his *Gardeners' Monthly* for December, 1884, and recorded his death in the number of *Meehan's Monthly* for March, 1893. Some interesting references to Brackenridge's activities during his residence in Washington during the years 1842–55 may be found in Rathbun's account of the Columbian Institute, in Bulletin 101 of the United States National Museum. An extended discussion of the publications of the Wilkes Expedition, by F. S. Collins, appeared in *Rhodora* for April, 1912. The published narrative of the expedition enables one to trace Brackenridge's movements, more or less accurately, during the cruise; but, for the earlier part of the voyage, the second volume of Pickering's "Geographical distribution of animals and plants" is even more valuable, as Brackenridge was with Pickering on ship-board, and accompanied him on nearly every trip ashore. It is from these sources, occasional scattered notes elsewhere, and the letters written by Brackenridge to Torrey and now preserved in the library of the New York Botanical Garden, that the present account has been prepared.

JOHN HENDLEY BARNHART.

THE COMPETITION IN DECORATIVE DESIGN

In order to continue the interest in the use of American plants in design, aroused by the recent exhibit at the Metropolitan Museum of Art, and described in the April issue of the JOURNAL, a competition for art students was held during the month of April. The following preliminary circular was issued:

AMERICAN WILD FLOWERS IN DECORATIVE DESIGN

Prizes for competitive designs for printed textiles, of four typical East American early-blooming wild flowers, are offered jointly

by the Metropolitan Museum of Art and by the New York Botanical Garden, supplementary to the exhibition of the Use of Plants in Decorative Design now in progress at the Museum.

The plants selected are:

1. Spring Beauty.
2. Dutchman's Breeches.
3. Rue Anemone.
4. Bloodroot.

The competition is open to all art students.

Competitors must report on afternoons to be designated, at three o'clock, at the Mansion, New York Botanical Garden, Bronz Park, when notified that the plants are in flower, and bring their material with them. They will be shown the plants growing, and specimens will be brought to the Mansion for designing.

It is expected that the plants will flower this year during the period between April 12 and April 25, depending on the advance of spring. Each competitor will submit four designs, one based on each of the four plants selected. The designs may be carried out:

a. With paint on paper, or
b. In the form of hand-decorated textiles, or block-printed textiles, batik, etc.

Intending competitors must write to the Director-in-Chief, New York Botanical Garden, giving their names, addresses, and the schools in which they are students, not later than April 17.

Two first prizes of $50 each, two second prizes of $25 each, two third prizes of $15 each, and two fourth prizes of $10 each will be awarded by a joint committee of the two institutions, and announced.

The object of the competition is to encourage the use of American wild flowers in decorative design.

Notwithstanding the haste with which preparations were necessarily made, since the plants were rapidly coming into bloom, over thirty competitors registered in response to this announcement, while twenty-six submitted designs and evinced the keenest interest throughout. The first meeting was held at the Mansion, Saturday, April 19, and all the work was done there. Experience soon showed that the time originally allotted for the contest was insufficient, and the Mansion was accordingly

opened to the competitors for eight days, and the finished designs were submitted on Monday, April 28.

Mr. H. F. Kent, secretary of the Metropolitan Museum of Art, appointed as judges Miss Abbot, of the Metropolitan Museum, Mrs. Britton, of the Garden, and Miss Cornell, of Teachers' College, Columbia University. Since in the opinion of the judges none of the designs was worthy of a first prize, only six prizes were awarded, which were distributed as follows:

Second prizes of $25 each: Marjory F. King, Katherine S. Lamb.

Third prizes of $15 each: Ethelyn C. Stewart, Dorothy Asbury.

Fourth prizes of $10 each: Amy Stevenson, G. Marie Le Prince.

Through the generosity of a friend of the Garden, prizes of five dollars each were awarded to each of the other competitors who submitted designs.

H. A. Gleason.

COMPLIMENTARY DINNER TO DR. BRITTON

The Board of Managers of the New York Botanical Garden gave a dinner to Dr. N. L. Britton at the Metropolitan Club, May 7, the guests including the Scientific Directors of the Garden and a number of other distinguished scientists. Dr. D. T. MacDougal, of the Carnegie Institution of Washington, formerly Director of the Laboratories at the Garden, acted as toastmaster. The speakers included Dr. Arthur Hollick, who mentioned Dr. Britton's early botanical work on Staten Island; Dr. Henry Fairfield Osborne, on Dr. Britton's part in the development of science in New York; Provost W. H. Carpenter, on his relation to Columbia University; Professor Robert A. Harper, on his relation to botanical research; and Dr. George T. Moore and Dr. C. Stuart Gager, who brought greetings from the Missouri Botanical Garden, of St. Louis, and the Brooklyn Botanic Garden. Dr. Lewis R. Morris read letters of appreciation from several who were unable to attend. At the close of the dinner, following a congratulatory address by Mr. Robert W. De Forest, a huge specimen of *Echinocactus* was unveiled, symbolic of Dr.

Britton's recent monographic studies on Cactaceae, within which was concealed a handsome loving cup, bearing the inscription:

To
NATHANIEL LORD BRITTON, SC.D., L.L.D.
FROM
THE MANAGERS OF
THE NEW YORK BOTANICAL GARDEN
IN RECOGNITION OF
HIS DISTINGUISHED SERVICE
TO
THE GARDEN, PUBLIC EDUCATION AND SCIENCE
1896–1919

Dr. W. Gilman Thompson, president of the Board of Managers, announced that the dinner was not in celebration of any event or anniversary, but was given as a token of the good will, the esteem, and the confidence of the Board of Managers.

H. A. GLEASON.

THE DIGGER PINE IN THE BOTANICAL GARDEN

In the pinetum there have been for several years two specimens of the digger pine, *Pinus Sabiniana*. One of these was secured by exchange with the Department of Parks, Borough of The Bronx, in 1900, and was located on the southern side of the knoll to the east of Conservatory Range 1, in a protected place but in a rather dry situation. This specimen died during the past winter. The other was raised from seed secured by Dr. F. E. Lloyd in 1898. It was transferred to the pinetum in May, 1906, to a position more wind-swept than that occupied by the other specimen but more favorable in its moisture conditions. This, still in good condition, is located just to the southeast of the fountain enclosure at the foot of the Museum approach. This pine is seldom seen in cultivation and is one of the rarest specimens in the pinetum.

The digger pine is native in western California on dry foothills, singly or in small groups, ranging through altitudes from 500 to 4,000 feet; it is most abundant, however, and attains its greatest size on the sun-baked slopes in the middle of the state. It reaches a height usually of 40 to 50 feet, although it is sometimes larger than this. The Indians of California found in its sweet seed a valuable article of food. The digger pine was discovered in 1831 by David Douglas on the mountains near Monterey and was introduced the following year by its discoverer into Europe, where it was first cultivated in the garden of the Horticultural Society of London at Chiswick. It is named in honor of Joseph Sabine, at that time secretary of the Horticultural Society.

GEORGE V. NASH.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Tilia Oliveri. OLIVER'S LINDEN.

Location: Arboretum.

Natural distribution: Central China.

Tilia platyphyllos. LARGE-LEAVED LIME.

Location: Arboretum.

Natural distribution: Europe.

Tilia platyphyllos var. **Beaumonti pendula.** BEAUMONT'S WEEPING LARGE-LEAVED LIME.

Location: Arboretum.

Tilia platyphyllos var. **corallina.** RED-TWIGGED LIME.

Location: Arboretum.

Tilia platyphyllos var. **laciniata.** CUT-LEAVED LIME.

Location: Arboretum.

Tilia tomentosa. WHITE LINDEN.

Location: Arboretum.

Natural distribution: Eastern Europe and Asia Minor.

Tilia tomentosa var. **petiolaris.** WEEPING WHITE LINDEN.

Location: Arboretum.

Grewia. GREWIA

Grewia parviflora. SMALL-FLOWERED GREWIA.
Location: Fruticetum.
Natural distribution: Northern China to Corea.

MALVACEAE. Mallow Family

Hibiscus. HIBISCUS

Hibiscus syriacus. ROSE-OF-SHARON.
Location: Fruticetum.
Natural distribution: Asia.
Hibiscus syriacus var. **Jeanne d'Arc.** JEANNE D'ARC ROSE-OF-SHARON.
Location: Fruticetum.

DILLENIACEAE. Chalta Family

Actinidia. ACTINIDIA

Actinidia arguta. SHARP-TOOTHED ACTINIDIA.
Location: Viticetum.
Natural distribution: Japan, Corea, and Manchuria.
Actinidia chinensis. CHINESE ACTINIDIA.
Location: Nursery enclosure.
Natural distribution: China.

THEACEAE. Tea Family

Stewartia. STEWARTIA

Stewartia pentagyna. MOUNTAIN STEWARTIA.
Location: Fruticetum.
Natural distribution: Southeastern United States.
Stewartia Pseudocamellia. JAPANESE STEWARTIA.
Location: Fruticetum.
Natural distribution: Japan.

HYPERICACEAE. St. John's-wort Family

Hypericum. ST. JOHN'S-WORT

Hypericum aureum. GOLDEN ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Hypericum galioides. BEDSTRAW ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Southern United States.
Hypericum hircinum. GOAT ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Mediterranean Region.
Hypericum Kalmianum. KALM'S ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Quebec to Wisconsin and Illinois.
Hypericum patulum. SPREADING ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Japan.
Hypericum patulum var. **Henryi.** HENRY'S SPREADING ST. JOHN'S-WORT.
Location: Fruticetum.
Hypericum prolificum. SHRUBBY ST. JOHN'S-WORT.
Location: Fruticetum.
Natural distribution: Eastern United States.

TAMARICACEAE. Tamarisk Family

Tamarix. TAMARISK

Tamarix odessana. CASPIAN TAMARISK.
Location: Fruticetum.
Natural distribution: Caspian Region.
Tamarix parviflora. SMALL-FLOWERED TAMARISK.
Location: Fruticetum.
Natural distribution: Southern Europe.
Tamarix pentandra. PALLAS' TAMARISK.
Location: Fruticetum.
Natural distribution: Southeastern Europe to Central Asia.

THYMELEACEAE. Mezereon Family

Daphne. DAPHNE

Daphne Cneorum. GARLAND FLOWER.
Location: Fruticetum.
Natural distribution: Central Europe.

Daphne Genkwa. CHINESE DAPHNE.
Location: Fruticetum.
Natural distribution: China.

Dirca. LEATHER-WOOD

Dirca palustris. LEATHER-WOOD.
Location Fruticetum.
Natural distribution: Eastern North America.

ELAEAGNACEAE. Oleaster Family

Hippophaë. SEA BUCKTHORN

Hippophaë rhamnoides. SEA BUCKTHORN.
Location: Fruticetum.
Natural distribution: Europe and Asia.

Lepargyraea. BUFFALO-BERRY

Lepargyraea argentea. BUFFALO-BERRY.
Location: Fruticetum.
Natural distribution: Central North America.

Elaeagnus. OLEASTER

Elaeagnus angustifolia. OLEASTER.
Location: Fruticetum.
Natural distribution: Southeastern Europe and western Asia.
Elaeagnus angustifolia var. **orientalis.** ORIENTAL OLEASTER.
Location: Fruticetum.
Elaeagnus commutata. SILVER-BERRY.
Location: Fruticetum.
Natural distribution: Northern North America.
Elaeagnus multiflora. GOUMI.
Location: Fruticetum.
Natural distribution: Japan and China.
Elaeagnus umbellata. UMBELLED OLEASTER.
Location: Fruticetum.
Natural distribution: Japan.

ARALIACEAE. Ginseng Family

Hedera. Ivy

Hedera Helix. English Ivy.

Location: Wall at approach to elevated railway.

Natural distribution: Europe, Canaries, Northern Africa, and Asia.

Acanthopanax. Acanthopanax

Acanthopanax Maximowiczii. Maximowicz's Acanthopanax.

Location: Arboretum.

Natural distribution: Japan.

Acanthopanax pentaphyllum. Five-leaved Acanthopanax.

Location: Fruticetum.

Natural distribution: Japan.

NOTES, NEWS AND COMMENT

Dr. Stewardson Brown, curator of the Herbarium of the Philadelphia Academy of Sciences, spent a week at the Garden in May.

Mrs. Maud L. Johnston is the first woman to register for the course in gardening, which has been in progress at the Garden since January.

Bulletin of the New York Botanical Garden number 37, with 87 pages, was issued May 12, 1919. It contains the annual reports of the director-in-chief and other officers for the year 1918.

Mrs. E. G. Britton spoke before the Plainfield Garden Club on May 14 and the Rumson Garden Club on May 20, on the subject "Rare plants hardy in the New York Botanical Garden," accompanying her remarks by a demonstration of the plants.

Professor H. M. Fitzpatrick, of Cornell University, recently spent several days at the Garden consulting material for the

completion of his monograph on the Coryneliaceae, a group of parasitic fungi which occur mainly in the tropics.

Volume 24, part 1, of *North American Flora*, was issued April 25, 1919. It comprises a part of the tribe Psoraleae of the family Fabaceae, by Dr. P. A. Rydberg, curator at the Garden; the genus *Eysenhardtia* by Dr. Francis W. Pennell, associate curator.

Dr. W. A. Murrill, supervisor of public instruction, addressed the North Country Garden Club, at Westbury, Long Island, on May 28 on "Trees," and followed his lecture by an inspection of the trees on the grounds of his hostess, Mrs. Beekman Winthrop.

Meteorology for April.—The total precipitation for the month was 2.80 inches. The maximum temperatures for each week were 65° on the 4th, 70° on the 8th, 68° on the 19th, and *71° on the 27th*. The minimum temperatures were 38° on the 14th, 36° on the 19th, *28° on the 25th*, and 37° on the 30th.

Mr. Marshall O. Howe, of Brattleboro, Vermont, died May 13, aged 86 years. Mr. Howe had long been interested in the local flora of his region, and was the father of two well-known botanists, Dr. Clifton D. Howe, of the University of Toronto, and Dr. Marshall A. Howe, curator of algae at the Garden.

Dr. Francis W. Pennell, associate curator at the Garden, addressed the Botanical Society of Pennsylvania at the University of Pennsylvania, Philadelphia, April 28, describing his botanical exploration of the eastern Andes of Colombia. On May 3 Dr. Pennell spoke on "The wild flowers of spring" to the boys of the Loomis Institute, Windsor, Conn.

An ornithological event of unusual interest in the Garden was the nesting of a Black Duck. A representative of the American Museum of Natural History verified the identification and

photographed the bird on the nest. Although the nest was placed in an exposed position at the base of a tree, not more than thirty feet from a foot-path, the brood was hatched successfully.

The following scientists have recently registered in the library: Dr. J. Chester Bradley, Ithaca, N. Y., Dr. E. W. Brandes, Washington, D. C., Dr. Mel T. Cook, New Brunswick, N. J., Dr. Alexander W. Evans, New Haven, Conn., Dr. J. N. Rose, Washington, D. C., Mr. Camillo Schneider, Jamaica Plain, Mass., Prof. James W. Toumey, New Haven, Conn., and Dr. H. H. Whetzel, Ithaca, N. Y.

A joint meeting of the Torrey Botanical Club and the Wild Flower Preservation Society of America was held at the Mansion, May 15, with Mrs. E. G. Britton as hostess. Short talks were made by Mr. Sereno Stetson on the relation of the Boy Scout movement to wild flower preservation and by Mr. H. M. Denslow on the native orchids. The address of the day was delivered by Mr. Stewardson Brown, of Philadelphia, on the native wild flowers of Pennsylvania, including those of the pine barrens of New Jersey, and was illustrated by colored slides taken from original photographs by the speaker.

The monograph of the Cactus Family, upon which Dr. Britton has been at work for several years in coöperation with Dr. J. N. Rose, of the United States National Museum, for publication by the Carnegie Institution of Washington, is approaching completion. Dr. Rose spent portions of April and May at the Garden for this investigation. The work will be issued in four quarto volumes, freely illustrated by colored plates and by reproductions of photographs and line drawings. The first volume, in completed page proofs, was turned in for printing in May; the second volume, for which illustrations have been made, is all ready for the printer; the third volume is nearly completed in manuscript, and much work has been done upon the fourth.

The Bagworm or Basket-worm

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THE BAGWORM OR BASKET-WORM

(WITH PLATE 232)

One of the biting insects which is responsible for a great deal of damage to trees and shrubs both in parks and in private grounds is the insect which is indicated by the title of this paper. The characteristic habits of the insect have given to it the very suggestive name which it bears. During the process of feeding the worm spins about itself a bag or basket which is carried about with it during the entire feeding stage. The bag is composed of silk together with bits of leaves or minute twigs from the plant on which the insects happens to be feeding. These are woven together in such a way as to obscure the caterpillar within and present a very ragged and unkempt appearance. Whether the bits of leaves and other debris are used to strengthen the bag or are employed as a deceptive device to render the insect less conspicuous is a question which the reader is at liberty to answer for himself.

While feeding, the head of the worm can be seen protruding from the mouth of the bag, which is carried by the caterpillar while it clings to the plant with its three pairs of strong legs. When disturbed or while at rest the bag is suspended from a twig by a mass of silk threads which are wound about the twig like a sheath, the caterpillar then being entirely concealed within.

Unlike many of our troublesome insect pests, the bagworm is undoubtedly a native of this country, being found in the eastern half of the United States as far north as Massachusetts and as

far south as Texas, but is less evident or absent in the other Gulf states. In many of the states this insect causes a great amount of damage.

The bagworm is almost an omnivorous feeder, attacking all kinds of deciduous trees and shrubs, and also seems to be very fond of conifers of various kinds. The caterpillars seem to be entirely oblivious of either taste or smell, attacking trees whose foliage would naturally seem to be repulsive, such trees as the sassafras having been found on our grounds almost entirely defoliated by them. While also especially fond of evergreens they show some preference for the arbor-vitae. Where the insect gains the upper hand before being detected these trees may be almost entirely defoliated by them in a short time. They do not as a rule feed on herbaceous plants, although they have been known to do so in the absence of other suitable foods. While at times they seem to be rather selective in their habits, they nevertheless appear to be able to adapt themselves readily to almost any kind of green plant food.

The eggs of the female are deposited in the bag, which is suspended to a twig where it remains over winter. Late in the spring the caterpillars hatch, leave the old nest, and attack the nearest leaf. There they begin to feed and to construct a bag of silk and debris. While the larva is small the case is carried upright, but as it becomes larger it is allowed to hang down. The caterpillar molts four times before it reaches maturity. During the process of molting the bag is attached to a twig by means of silk fastening. At the bottom of the bag is a small opening through which the old skin and excrement are pushed out of the nest.

Toward midsummer the caterpillar attaches the bag to a twig and lines it with another layer of silk and the bag now becomes its cocoon. The pupal stage lasts about three weeks, at the end of which time the adult appears. The male works its way through the bottom of the bag and the winged adult moth makes its escape.

The female moth is wingless and legless and never leaves the cocoon, but merely emerges far enough to permit mating. She

then deposits her eggs in the bag and in a short time emerges a second time from the cocoon, dies, and falls to the ground. The eggs remain in the bag until time to hatch the following spring.

Since the eggs are deposited in the bags and remain there during the winter, one of the best means of controlling the insect is to collect and burn the female bags before time for the young caterpillars to emerge in the spring. This is not a difficult matter, especially on deciduous trees, since the bags are very conspicuous in the winter after the leaves have fallen. When we take into consideration the fact that for each female bag burned a large number of eggs have been destroyed which would otherwise have developed into active caterpillars in the spring, we can appreciate the value of this means of control. Hand picking in the summer time is also quite effective and practical especially on small evergreens and shrubs. Even on large trees a great deal can be accomplished along this line by the use of a long-handled pruning hook.

If the hand picking has been neglected or the insects are too numerous to be handled by this means, the caterpillar, being a leaf-feeder, can be checked by the use of a stomach poison sprayed or dusted on in the usual manner. If hand picking has been persistently practiced spraying will seldom be necessary for this insect. During the present spring a careful search of a large number of small evergreens revealed only a half dozen bags and all of these were on arbor-vitae. Of course some were doubtless overlooked. Hand picking has been claimed to be uneffective for evergreens because of the difficulty of locating the bags, but in our own grounds it has been found quite effective.

Like most destructive insects the bagworm has a large number of natural enemies, although on account of their protection they are not easily taken by birds. Their most effective natural enemies consist of other kinds of insects. One objection to the burning of the bags which have been gathered is the fact that in destroying the bagworm eggs we also destroy a large number of parasites, which if allowed to emerge would be decidedly beneficial in holding the harmful insect in check. As a safe-guard against this the bags can be placed in a barrel or other

receptacle with a screen over the top which will allow the parasites to escape. Or, if the bags are piled some distance from available food supply, the parasites will be allowed to escape and the young bagworm, since it possesses limited powers of locomotion, will die before being able to reach suitable food plants.

Since in the control of most insects we are largely dependent upon the enemies provided by nature it is quite advisable that we should do all in our power to know and encourage these enemies. Probably the occurrence of frequent epidemics of harmful insects is due very largely to the suppression of their natural enemies and with the reoccurrence of these the epidemic subsides. Very often the favorable results which we attribute to our own efforts are mainly due to the interference of nature. This, however, should not serve to discourage the application of artificial remedies, but should make us cautious in taking too much credit to ourselves for the results which follow.

FRED J. SEAVER.

THE RE-DISCOVERY OF *FISSIDENS DONNELLII* AUSTIN

(WITH PLATE 233)

It gives me much pleasure to be able to contribute some additional information on one of our rarest species of mosses, especially since the ninetieth birthday of Capt. John Donnell Smith, for whom the species was named, was celebrated June 5 by all American botanists, who have gladly acknowledged their indebtedness to his zeal and inspiration.

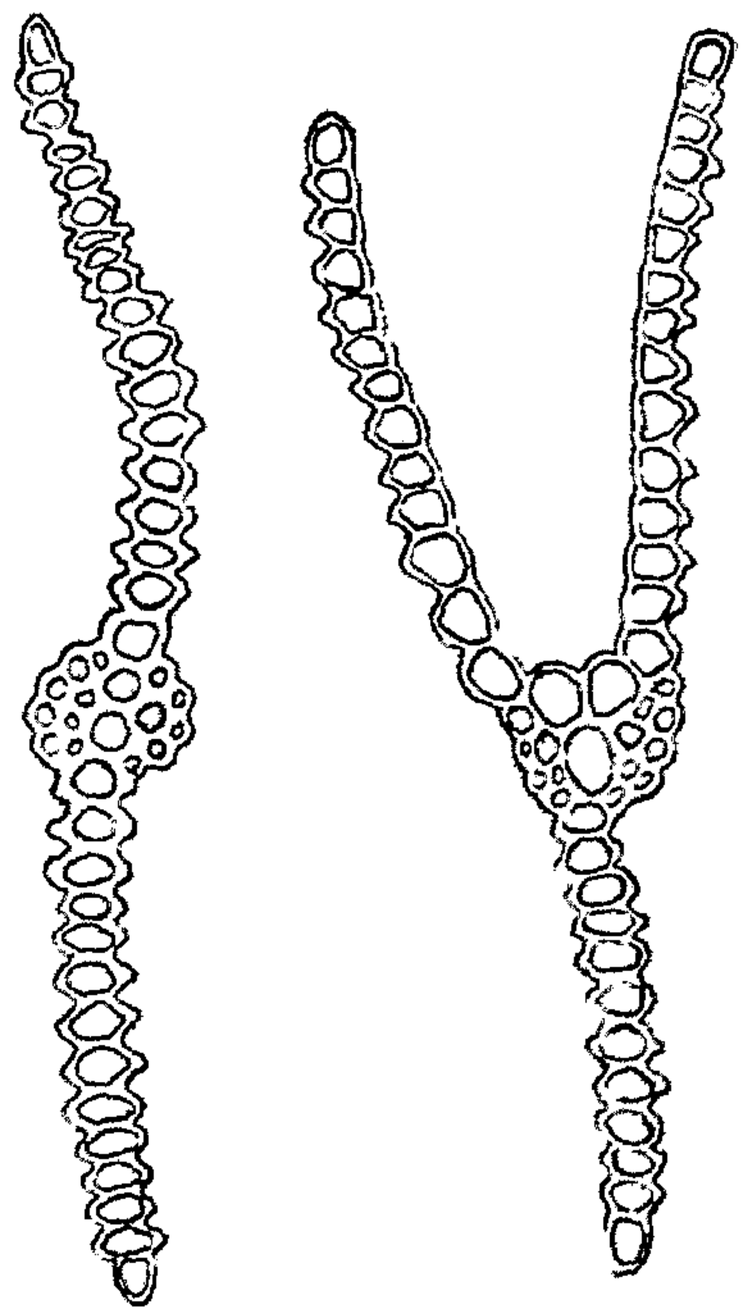
Fissidens Donnellii has at last been found in fruit by Mr. Severin Rapp, of Sanford, Florida, to whose systematic search we owe so many interesting Bryophytes. Austin's original specimens bore setae, but were without capsules and were collected at Caloosa in 1878; Mr. Rapp's specimens are in good fruit and extend the range of the species nearly 130 miles farther north. They have enabled me to compare critically this species with its tropical allies, to reduce to synonymy a Mexican and a

Brazilian species, and to greatly extend its range. Strangely enough, West Indian specimens are still lacking.

Fissidens Donnellii Aust. Bot. Gaz. 4: 151. 1879

Fissidens tenerrimus C. Muell. Act. Soc. Sc. Fenn. **19**: 10. 1891.
Fissidens crenato-serrulatus Card. Rev. Bryol. **36**: 70. 1909.

Plants minute and decumbent, growing at the base of trees only in tropical or subtropical regions: sterile stems 2–3 mm. high with 6 or 7 pairs of leaves, the uppermost smaller than those of the fruiting plants, only 1 mm. long by 0.16 mm. wide, spreading: fertile stems 2–4 mm. high, often arising as basal offshoots from old decumbent sterile plants; leaves more or less secund when dry, usually few, only 3–5 pairs, very unequal in size, the uppermost or perichaetial leaves 1.5 mm. long by 0.25 mm. wide, expanded at base, incurved, falcate, and usually one of the leaves narrower and contracted below the junction of the duplicate blades; margins not bordered, sharply and regularly crenate-serrate, cells larger and not papillose: duplicate blades unequal, narrowed at one side to the costa, sometimes contracted at the junction; costa ending below the acute apex, pellucid, crenulate in cross-section, with 3 large central ducts and 2 narrow stereid bands; cells sharply mamillose, each with a large central papilla on both surfaces, except the inner face of the duplicate blades, those of the apical blade 8–13 μ in diameter, irregularly hexagonal, in cross-section thicker than wide; cells of duplicate blade very irregular in shape and size, up to 18 μ, next the vein; the margins coarsely and unequally toothed. Synoicous, the antheridia terminal on small basal plants, usually few, 2 or 3 mixed with the archegonia and without paraphyses. Seta erect or bent at base, 2–3 mm. long; capsule erect and symmetric, small, only 0.66–0.75 mm. long, with a lid which equals the urn and has a long straight or curved beak; calyptra covering only the beak; walls not thickened, of clear oblong cells up to 27 μ long;



Drawings from Austin's type. × 270.

1. Cross-section of apical part of leaf.

2. Cross-section of basal part of leaf.

mouth and base of lid bordered with smaller denser cells; neck with a few large stomata; peristome bright-red, spreading when dry, strongly incurved when moist; teeth about 120 μ long, divided 2/3 their length, spiral at apex, trabeculate and slightly ciliate on the inner surface with projecting dorsal joints at base; spores green, smooth, 13–21 μ, maturing in summer.

Habitat and type locality: At base of cypress trees, Caloosa, Florida (*John Donnell Smith and C. F. Austin*, 1878, without capsules).

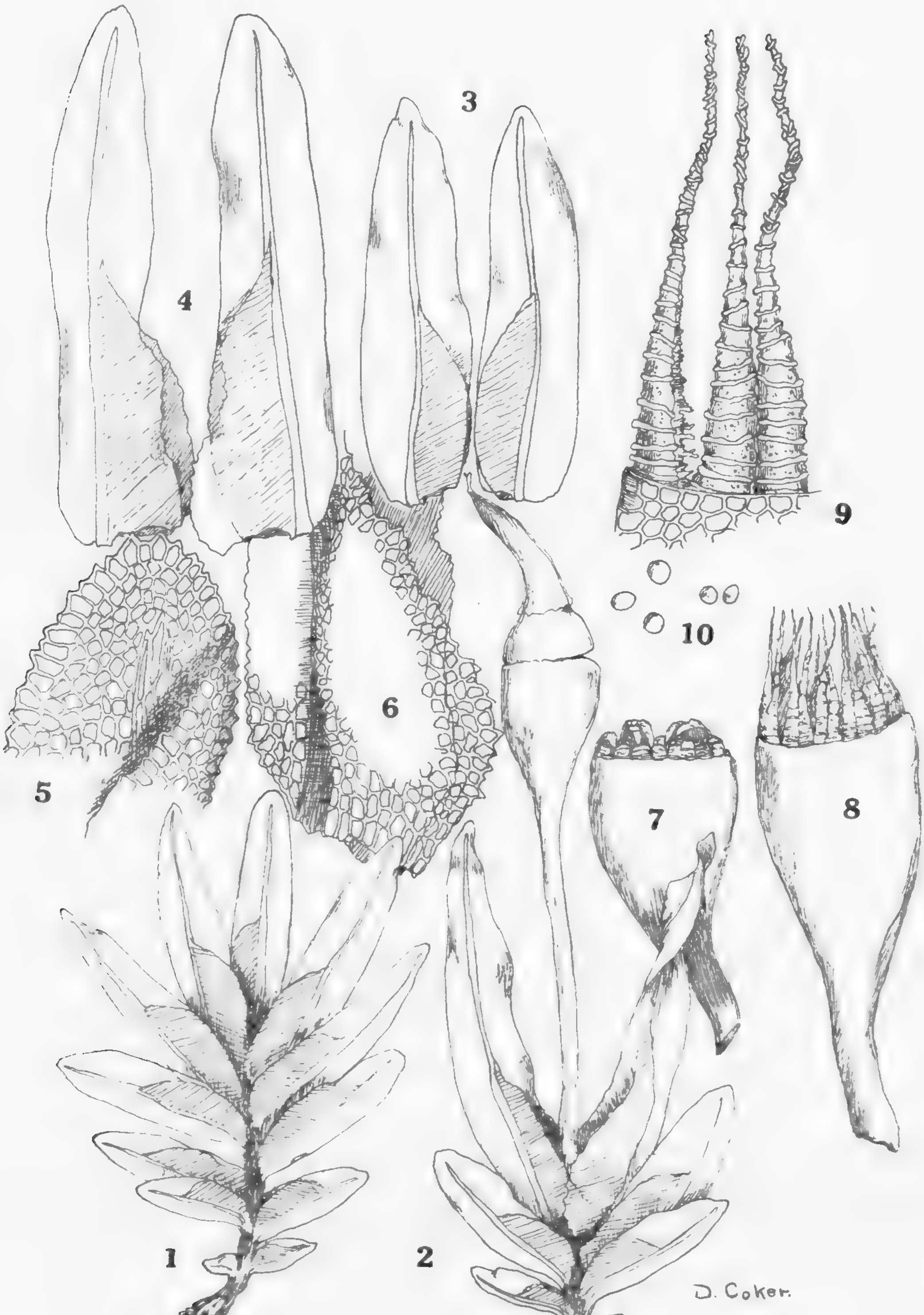
Distribution: Rediscovered at Sanford, Florida, by S. Rapp, 1918; also Mexico (*C. G. Pringle 15,167*, 1908, as *F. crenato-serrulatus* Card.) and Minas Geraes, Brazil (*Wainio*, 1885, sterile, ex. herb. Brotherus, as *F. tenerrimus* C. Muell.).

Dr. Charles R. Barnes,* in his Revision of the North American species of *Fissidens*, said of *F. Donnellii:* "This plant has been collected but once, without capsules, and ought probably to be referred to *F. subcrenatus* of Schimper, a Mexican species, from which its known characters differ only by the less number (by one pair) and greater narrowness of the leaves. The larger cells and the distinct serration of the leaves are obvious distinctions from *F. Garberi*, to which it is closely allied."

I cannot agree with these statements: because *F. subcrenatus* Schimp., collected in Mexico by Liebmann in 1843, belongs in the section *Aloma*, where Brotherus has placed it, with the leaf margins almost entire and the cells smooth, not mamillose; nor is it closely allied to *F. Garberi*, since that belongs in the section *Semilimbidium*, with the basal part of the duplicate blades of the perichaetial leaves bordered and having its leaf cells only 5–8 μ in diameter, each with 2–4 small papillae, and the marginal cells either truncate or serrulate. *Fissidens Donnellii* belongs in the section *Crenularia* with sharply toothed leaves, and may possibly be related to, but is not identical with, *F. prionodes* Mont. (1835), if Brotherus is right in referring that species to this section. The drawings in the Annales† seem to indicate a leaf with very large papillae, but original specimens from Montagne in Mitten's collection belong to the section *Aloma*, with

* Bot. Gaz. 12: 30. 1887.

† Mont. Ann. Sci. Nat. II. 3: 200. *pl. 3. f. 1.* 1835.



Fissidens Donnellii Austin

only 4–6 rows of cells on each side of the costa, and figures *b* and *c* may be only a rough attempt to show these cells, instead of being intended for papillae, which would be much exaggerated in size. As no mention is made in the original description of the cells being papillose, and as Mitten's specimens agree in all other respects with the description of type specimens collected by Leprieur in Guiana, it would be natural to suppose that they are typical of this species. Numbers 494–496 of Spruce were also distributed as this species.

Carl Mueller* was responsible for describing this species as papillose ("grossiuscule papillose-areolata"); whether he ever saw type specimens does not appear, though he states that it is "dioicous." I have discovered some confusion and mixture in Montagne's herbarium between two other species, *F. radicans* and *F. guianensis*, and it is just possible that the specimens sent to Mitten may not have been typical, though marked "ex Hb. Montagne," or Mueller may have had a mixture.

F. corticola Schimp.; Besch. (not Montagne) from Guadeloupe has the same prominent mamillose cells, sharply toothed margins, and great inequality of the duplicate blades; but the costa is percurrent into an apiculate apex, the duplicate blades of the perichaetial leaves are bordered, as in *F. diplodus* Mitten (1869) and *F. constrictus* C. Muell. (1897), and all of these species are larger, with a greater number of leaves than in *F. Donnellii*. *F. muriculatus* Spruce differs in the smaller (5–8 μ) cells of the leaves and in the peristome, the teeth of which have 2–3 transversely elongated, thick, basal segments and are not spiral at apex.

ELIZABETH G. BRITTON.

DESCRIPTION OF PLATE 233

1. Sterile plant with 6 pairs of leaves.

2. Fertile plant with 3 pairs of leaves, the perichaetial much the longest pair. Seta and capsule erect, calyptra apical.

3. One pair of leaves, showing costa ending below the apex and unequal duplicate blades.

4. Perichaetial leaves, showing the serrate and unequal duplicate blades.

5. Apex of leaf, showing larger, irregularly serrate, marginal cells and profile of dorsal surface with projecting, sharply mamillose cells.

* Synopsis Muscorum 2: 534. 1851.

6. Basal part of duplicate blade, showing sharp serrations and elongated cells at base.

7. Capsule with incurved peristome when moist.

8. Capsule with erect peristome when dry.

9. Teeth enlarged to show trabeculate and ciliate base and spiral apex.

10. Smooth spores.

CONFERENCE NOTES FOR APRIL

A conference of the scientific staff and registered students of the Garden was held on the afternoon of April 2, at which the following program was presented:

"Further data on the behavior of intermediates between sugar and starch corns," by Professor R. A. Harper.

"Phylogeny within the genus *Afzelia*," by Dr. F. W. Pennell.

Professor Harper exhibited specimens showing the results of crossing sugar and starch corns and illustrating the results of subsequent selection for intermediate races such as he had previously reported as possibly valuable as meal corns. He presented further data as to these races when intercrossed and back-crossed upon the parent races. In both cases they transmit more or less fully their special characters in the new combinations.

Dr. Pennell's report was an account of the trend of evolution in the genus *Afzelia* of the Scrophulariaceae. This group was studied at the University of Pennsylvania, and the detailed results are yet to be published. The work was introduced now because this genus presents a remarkably clear series of stages in the evolution of the flowers.

The most primitive groups are the *Virgatae*, comprising six species that are perennials, and the *Laciniatae*, of one annual species native of southern Mexico. In these the flower approaches closely that normal to this subtribe, the *Agalinanae*. The corolla is campanulate, its lobes shorter than the tube, and it is pubescent within at the base of the upper lobes. The filaments in some species are flattened and ribbon-like through almost their entire length, in others toward the apex they are abruptly contracted and from that point filamentous. The anther-sacs open by an orifice extending their entire length.

Through northern Mexico species occur showing successive modifications in these characters until one finds the following condition in the *Pectinatae* and *Cassioides* of the southeastern United States. The corolla is rotate, its lobes much longer than the tube, glabrous within (irregularly slightly pubescent in *Pectinatae*); the filaments are flattened and pubescent for only a slight portion at the base, and filamentous nearly throughout; the anther-sacs open by slits extending never over one fourth their length, suggesting a terminal pore.

Although they are alike in flower-structure, the differences in the leaves, fruit, and seeds of the *Pectinatae* and *Cassioides* place these in divergent lines of evolution. The intermediate species group themselves on one or the other phylogenetic stem. *Afzelia* illustrates not only progressive evolution, with progressive removal from the geographic point of origin, but exhibits this in two lines of advance and thus affords a remarkable case of parallel evolution.

A. B. Stout,
Secretary of the Conference.

SUMMER LECTURES, 1919

The following program of public lectures has been announced for the summer of 1919. As usual, they will be held in the lecture hall of the Museum, Saturday afternoons at four o'clock.

June 21. "Edible Wild Mushrooms," by Dr. W. A. Murrill.

June 28. "Some Books on Gardening," by Dr. J. H. Barnhart.

July 5. "Why and How to Spray Plants," by Dr. E. B. Southwick.

July 12. "Dwarf Fruit Trees for Suburban Homes," by Capt. F. A. Waugh.

July 19. "Rose Gardens," by Mr. George V. Nash.

July 26. "Attractive Flowering Plants of New York State," by Dr. H. D. House.

Aug. 2. "Floral and Scenic Features of the Island of Jamaica," by Dr. Marshall A. Howe.

Aug. 9. "Through the Central Andes of Colombia," by Dr. Francis W. Pennell.

Aug. 16. "Botanical Features of Ceylon," by Dr. H. A. Gleason.

Aug. 23. "Flowering Shrubs," by Mr. Arthur Herrington.

(Exhibition of Gladioli, August 23 and 24.)

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Acanthopanax senticosum. MANCHURIAN ACANTHOPANAX.

Location: Fruticetum.

Natural distribution: Manchuria.

Acanthopanax sessiliflorum. SESSILE-FLOWERED ACANTHOPANAX.

Location: Fruticetum.

Natural distribution: Manchuria and northern China.

Aralia. ARALIA

Aralia chinensis. CHINESE ANGELICA-TREE.

Location: Fruticetum. Arboretum.

Natural distribution: China and Japan.

Aralia chinensis var. **glabrescens.** SMOOTH CHINESE ANGELICA-TREE.

Location: Fruticetum. Arboretum.

Aralia chinensis var. **mandshurica.** MANCHURIAN ANGELICA-TREE.

Location: Fruticetum.

Aralia chinensis var. **variegata.** VARIEGATED CHINESE ANGELICA-TREE.

Location: Fruticetum.

Aralia spinosa. HERCULES' CLUB.

Location: Fruticetum.

Natural distribution: Southeastern United States.

CORNACEAE. Dogwood Family

Nyssa. Sour Gum

Nyssa sylvatica. Sour Gum.
Location: Wild, common.
Natural distribution: Eastern North America.

Cornus. Dogwood

Cornus alternifolia. Alternate-leaved Dogwood.
Location: Fruticetum. Wild.
Natural distribution: Eastern North America.

Cornus Amomum. Kinnikinnik.
Location: Fruticetum. Wild, along streams and in wet places.
Natural distribution: Eastern North America.

Cornus australis. Oriental Dogwood.
Location: Fruticetum.
Natural distribution: Asia Minor and Caucasus.

Cornus Baileyi. Bailey's Dogwood.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Cornus brachypoda. Short-stalked Dogwood.
Location: Fruticetum.
Natural distribution: Japan and central China.

Cornus controversa. Japanese Alternate-leaved Dogwood.
Location: Fruticetum.
Natural distribution: Himalayan region to Japan.

Cornus femina. Panicled Dogwood.
Location: Fruticetum.
Natural distribution: Northeastern United States.

Cornus glabrata. Californian Dogwood.
Location: Fruticetum.
Natural distribution: Oregon to California.

Cornus Mas. Cornelian Cherry.
Location: Fruticetum.
Natural distribution: Southern Europe and Asia Minor.

Cornus officinalis. Sandzaki.
Location: Fruticetum.
Natural distribution: Japan and China.

Cornus paucinervis. FEW-NERVED DOGWOOD.
Location: Fruticetum.
Natural distribution: Central China.
Cornus rugosa. ROUND-LEAVED DOGWOOD.
Location: Fruticetum.
Natural distribution: Northeastern North America.
Cornus sanguinea. DOGBERRY.
Location: Fruticetum.
Natural distribution: Europe and the Orient.
Cornus stolonifera. RED-OSIER DOGWOOD.
Location: Fruticetum.
Natural distribution: Northern North America.
Cornus stolonifera var. **flaviramea.** YELLOW-BARKED DOGWOOD.
Location: Fruticetum. West end of west lake.
Cornus stricta. STIFF DOGWOOD.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Cynoxylon. FLOWERING DOGWOOD

Cynoxylon floridum. FLOWERING DOGWOOD.
Location: Arboretum. Wild, common.
Natural distribution: Eastern United States.
Cynoxylon floridum var. **rubrum.** RED FLOWERING DOGWOOD.
Location: Arboretum.

Benthamia. JAPANESE FLOWERING DOGWOOD

Benthamia japonica. JAPANESE FLOWERING DOGWOOD.
Location: Fruticetum.
Natural distribution: China and Japan.

Chamaepericlymenum. DWARF DOGWOOD

Chamaepericlymenum canadense. DWARF DOGWOOD.
Location: American Wood Garden.
Natural distribution: Northern North America.

CLETHRACEAE. White-alder Family

Clethra. SWEET PEPPER-BUSH

Clethra acuminata. MOUNTAIN SWEET PEPPER-BUSH.
Location: Fruticetum.
Natural distribution: Southeastern United States.

Clethra alnifolia. SWEET PEPPER-BUSH.

Location: Fruticetum. Wild.

Natural distribution: Eastern United States.

Clethra barbinervis. ASIATIC SWEET PEPPER-BUSH.

Location: Fruticetum.

Natural distribution: Eastern Asia.

ERICACEAE. Heath Family

Rhododendron. RHODODENDRON

Rhododendron album var. **elegans.** WHITE SHOWY RHODODENDRON.

Location: North side of Conservatory Range 1.

Horticultural origin.

Rhododendron album var. **grandiflorum.** LARGE WHITE RHODODENDRON.

Location: Bank south of West Lake.

Horticultural origin.

Rhododendron arbutifolium. ARBUTUS-LEAVED RHODODENDRON.

Location: Fruticetum.

Hybrid.

Rhododendron atrosanguineum. DEEP RED RHODODENDRON.

Location: Bank south of West Lake.

Horticultural origin.

Rhododendron azaleoides. FRAGRANT RHODODENDRON.

Location: Fruticetum.

Hybrid.

Rhododendron carolinianum. CAROLINA RHODODENDRON.

Location: Bank, south side of west lake.

Natural distribution: Eastern Tennessee and western North and South Carolina.

Rhododendron catawbiense. MOUNTAIN ROSE BAY.

Location: Fruticetum. East bank of west lake.

Natural distribution: Southeastern United States.

Rhododendron catawbiense var. **album.** WHITE MOUNTAIN ROSE BAY.

Location: North side Conservatory Range 1.

Rhododendron catawbiense var. **grandiflorum.** LARGE-FLOWERED MOUNTAIN ROSE BAY.

Location: North side of Conservatory Range 1.

Rhododendron delicatissimum. PALE PINK RHODODENDRON.

Location: North side of Conservatory Range 1.

Horticultural origin.

Rhododendron Everestianum. EVEREST'S RHODODENDRON.

Location: Museum fountain. North side of Conservatory Range 1.

Horticultural origin.

NOTES, NEWS AND COMMENT

Dr. and Mrs. N. L. Britton spent a few days in June at Lake Mohonk, N. Y. and Dr. Britton addressed the guests of the Mountain House June 16 on "The Summer Wild Flowers of Mohonk."

Mrs. Flora W. Patterson, mycologist in the United States Department of Agriculture at Washington, was a recent visitor at the Garden. Mrs. Patterson is looked to for work on the Exoascales for North American Flora.

The Garden has recently received from Mr. A. S. Kalenborn an interesting collection of alpine plants from Peru, representing 128 species. They were obtained near Oroya, Peru, at altitudes ranging from 10,000 to 17,000 feet above sea level.

A set of herbarium specimens representing the species of *Ochroma* recently collected in Central America by Professor W. W. Rowlee has been added to the herbarium. The wood of *Ochroma*, known as balsawood, has recently attracted public attention because of its extreme lightness, adapting it to use in aeroplane construction.

Meteorology for May. The total precipitation for the month was 4.05 inches. The maximum temperatures recorded at the

New York Botanical Garden for each week were as follows: 92° on the 5th, 81° on the 14th, 76° on the 25th, and *94° on the 29th*. The minimum temperatures were *41° on the 10th and 16th*, 46° on the 21st, and 54° on the 28th.

The collection of dahlias, which attracted so much favorable comment last year, has again been planted near the New York Central station, and includes 379 named varieties. Near them 1,200 plants of hardy chrysanthemums have been set out, and in the Horticultural Grounds 20,000 corms of gladiolus have been planted, illustrating about 250 named varieties.

The Rose Garden reached its period of maximum spring flowering in the middle of June, when a great majority of the 450 kinds represented were in bloom at once. Some of the varieties suffered a little from the effects of unseasonably cold weather late in April, but the total amount of bloom was nevertheless fully as great as in 1918, although the flowering period was about a week later.

Professor Louis Blaringhem, distinguished botanist and geneticist of the University of Paris, spent a few days at the Garden recently. During the half-year just closed, Professor Blaringhem has been exchange professor from the Sorbonne to Harvard University, where he has delivered lectures on agriculture and heredity. While at the Garden Professor Blaringhem made a special study of herbarium material and living plants of the American oaks.

The display of Iris was at its height about Decoration Day, although some species had at that time already ceased to bloom and other late varieties had not yet begun. Of the latter, one of the most interesting is the red-brown flag, *Iris fulva*, whose deeply colored flowers were at their prime about June 15. This species is a native of the southern United States, extending as far north as southern Illinois; it is perfectly hardy in New York and is well worth a place in any Iris garden.

Dr. P. A. Rydberg recently spent a few days at the National Herbarium, Washington, D. C., studying the collections of the family Ambrosiaceae. The manuscript for a revision of this family has been almost ready for several years, waiting an opportunity for publication in the North American Flora. It will now soon appear in print as the first part of volume 33, together with Dr. H. A. Gleason's monograph of the tribe Vernonieae of the family Carduaceae.

An interesting species of arum from India, *Amorphophallus bulbifer*, flowered in Conservatory Range 1, House 11, on June 20. The flower of this species is extremely malodorous, the pollen evidently being distributed in the native habitat of the plant by means of flies. About a month after the appearance of the flower, a large compound leaf appears which bears bulbs very much resembling the common hard-skinned puffball. A more extended description of this plant may be found in the JOURNAL for June, 1916.

At its annual commencement June 25, the University of Vermont conferred the honorary degree of Doctor of Science on Dr. Marshall A. Howe, curator of flowerless plants at the Garden, as a recognition of his important achievements in algology. Professor George P. Burns presented Dr. Howe for the degree in the following words: "Marshall Avery Howe, a native of Vermont, a graduate of the University in the class of 1890, a doctor of philosophy from Columbia University in 1898, botanist, teacher, author, explorer, and research worker, who has won a prominent place in all these fields of botanical science."

Dr. John K. Small returned from Florida in May, after a successful excursion devoted to the study and collection of cacti, especially those of the cereus group. From Miami as headquarters, two collecting trips were made across the peninsula, the one to the mouth of the Manatee River, the other to the mouth of the Caloosahatchee and to Marco in the northern part of the Ten Thousand Islands. The Florida reef was visited at

points all the way from Key West to Miami. Heretofore unobserved centers of cactus growth were discovered where several kinds of night-blooming cereus and prickly pears were found.

M. Lucien Morellet, of Paris, vice-president of the Geological Society of France, has recently sent to the Garden, by way of exchange, twelve beautifully preserved specimens, representing as many species, of fossil algae of the family Dasycladaceae, all from the Parisian Eocene. The fossil algae in the Garden collections had hitherto consisted chiefly of Lithothamnieae, a group of calcified red algae, and this contribution of material representing a family of calcified green algae constitutes a noteworthy addition to the collection of algae and of fossil plants. Discovery of related fossils in American strata is to be expected.

On June 17, over 300 biology pupils from the Morris High School, with Dr. Peabody and eight teachers, spent the forenoon at the Garden observing and making notes on tropical plants, trees, economic plants, and plant products, under the guidance and instruction of their own teachers and most of the Garden staff. Mr. C. G. Abbott, of the State Conservation Commission at Albany, gave an account of the various measures being taken by the Commission to preserve the wild life and other natural resources of the state. His lecture was illustrated with handsome colored lantern slides and was listened to with deep interest.

Professor H. H. Whetzel, of Cornell University, accompanied by his assistant, Mr. E. F. Hopkins, recently spent several days at the Garden in connection with his work on parasitic fungi. The special object of the trip was to make a life-history study of *Sclerotinia Geranii*, recently described by Dr. F. J. Seaver on the rootstocks of the wild geranium and not known to occur in any other region than the type locality. A survey of the grounds of the Garden was made and some interesting data collected relative to fungi parasitic on cultivated flowering plants. Professor Whetzel is expecting to monograph the genus *Sclerotinia* for North American Flora.

Volume 1 of "The Cactaceae, Descriptions and Illustrations of Plants of the Cactus Family," by N. L. Britton and J. N. Rose, was published June 21, 1919, and will be followed by three additional volumes before the monograph is completed. The book is a quarto, printed in the usual style of the publications from the Carnegie Institution of Washington, of which this is number 248. It is illustrated by 5 plates in photogravure, 3 in half-tone, and 28 in color, and by 302 text figures in half-tone or zinc. The first two of the tribes of Cactaceae are included: Pereskieae, with a single genus and 19 species, and Opuntieae, with 7 genera and 283 species, of which 254 are comprised within the genus *Opuntia*.

Mr. Henry John Elwes, F.R.S., of Colesborne Park, near Cheltenham, Gloucestershire, spent portions of several days at the Garden about the middle of June, sailing for England on June 16. Mr. Elwes has been interested in botany for many years, and is well known to the scientific world not only by his numerous papers scattered in the proceedings of learned societies, but by his magnificent monograph of the genus *Lilium* (1877–1880), and the great work on the trees of Great Britain and Ireland (seven volumes, 1906–1915) prepared by him in collaboration with Dr. Augustine Henry. The monograph of *Lilium* is now about forty years old, and Mr. Elwes is at work upon a supplement to it.

The June Biological Trip of the Evander Childs High School to the New York Botanical Garden took place on Thursday, June 19, under the leadership of Mr. Paul B. Mann and three of his teachers, assisted by eight members of the Garden staff. The pupils, 300 in number, assembled at the entrance to Conservatory Range 1 and were guided through the fifteen houses of this range in groups of 30. Trees and various kinds of herbaceous plants were then studied in the valley east of the Conservatories, and plant products on the main floor of the Museum Building. Mr. George E. Hewitt gave an illustrated lecture on the subject of forestry, which was a fitting climax to a very successful and enjoyable occasion.

Through exchange with the American Museum of Natural History, the Garden has recently acquired twenty-eight specimens of matrix containing some twenty species of fossil plants, representing a part of the collection made in 1891 and 1892 on the south shore of Nugsuak peninsula, Greenland, by the Arctic Expedition of the Philadelphia Academy of Sciences, under command of Robert E. Peary, C.E. (now Rear Admiral), U.S.N. These are the only fossil plants from Greenland in the Garden collections and they constitute a very valuable and interesting addition to the Cretaceous and Tertiary floras. They apparently belong to the Upper Cretaceous (Patoot) and Eocene-Tertiary (Upper Atané) beds, described by Oswald Heer in his "Flora Fossilis Arctica," volumes 1, 2, 3, 6, and 7.

The following botanists have recently registered in the library: Professor L. R. Abrams, Stanford University, Cal.; Professor H. H. Whetzel, E. F. Hopkins and Professor H. M. Fitzpatrick, Ithaca, N. Y.; Dr. Camillo Schneider, Jamaica Plain, Mass.; Professor Alexander W. Evans and Professor James W. Toumey, New Haven, Conn.; Tetsu Sakamura, Sapporo, Japan; Masayasu Kanda, Hiroshima, Japan; Huron H. Smith, Milwaukee, Wis.; Professor D. S. Johnson, Baltimore, Md.; Professor L. Blaringhem, Université de Paris; Grace J. Livingston and Wm. T. Davis, New York; H. J. Elwes, Cheltenham, Eng.; Mr. and Mrs. W. W. Eggleston, Washington, D. C.; Professor Charles S. Boyer, Philadelphia, Pa.; and Prof. H. M. Quanjer, Wageningen, Holland.

The oldest Japanese chestnut tree on the grounds, one that has survived since the early days of the Garden, persisting through the terrible epidemic of canker which killed off all the other chestnuts, failed to put forth its leaves this spring. It is dead—killed by an attack of the canker that was almost imperceptible at first, but finally proved too strong for it. This tree has been carefully observed for fourteen years, or since the canker was discovered in this vicinity. The disease gained entrance several years ago through a small branch three feet above the ground

and worked away at the base of the trunk until it was completely girdled. Only one small canker was found in the top of the tree, which had a spread of twenty feet or more and remained green through the season of 1918.

Leaf-blight of the plane-tree and white oak has been unusually prevalent this season, owing to the wet weather in May. This disease, which renders the trees so unsightly, may be controlled by sanitation, pruning, and spraying, but the process is expensive and exacting. Spraying alone will be of value if done at the proper time. Use the strongest Bordeaux mixture (5–5–50), applying it thoroughly with a power sprayer before the leaves are half grown, and repeat two or three times at intervals of a week or ten days according to the weather. This solution kills the summer spores and prevents infection of the new leaves. If the dead twigs and leaves, both on the trees and on the ground, are collected and burned, the winter spores will be killed and the disease will not appear with the opening of the buds. All the trees in a given locality should be treated at once.

Dr. Fred J. Seaver spent the first week of June at Ithaca, New York, collecting fungi in collaboration with Cornell University, the Brooklyn Botanic Garden, and Syracuse University. Three main trips were made, one to Enfield's Gorge, one to Labrador Lake about forty miles from Ithaca, and one to the bogs of Mud Pond Basin near McLean. Other local trips were made in the gorges immediately adjacent to the college campus. When necessary, transportation facilities were provided by the extension cars of the Agricultural College and the various trips were attended by a number of the graduate students and staff of the department of plant pathology under the direction of Professor H. H. Whetzel. While an exact count has not yet been made, the trip will probably add more than two hundred specimens of ascomycetes and parasitic fungi to the Garden collections. No especial attention was given to the higher fungi since none of the party was particularly interested in those forms.

Figure 1. Bleaching the leaves of *Carloduvica palmata*.

Figure 2. Hybrid walnut tree.

JOURNAL

OF

The New York Botanical Garden

VOL. XX August, 1919 No. 236

BOTANICAL EXPLORATIONS IN ECUADOR IN 1918*

(WITH PLATES 234 AND 235)

Soon after the coöperative plan for botanical explorations in South America was organized by the New York Botanical Garden, the Gray Herbarium of Harvard University, and the United States National Museum, I was authorized to inaugurate this work in Ecuador.† I was accompanied by my son George who acted as photographer and general assistant. We left Washington July 22, 1918, going by way of Key West, Havana, and Panama to Guayaquil, Ecuador. At each of these places while waiting for steamers small collections were made.

We arrived in Guayaquil August 9, at a time when yellow fever was especially prevalent and very malignant, and we hoped to proceed immediately to the interior but were obliged to remain in Guayaquil from Friday until Monday. During this time we visited the neighboring hills about the city, which were then most luxuriantly clothed with flowering vines and shrubs. Guayaquil has long been a very interesting botanical locality, for here it was that Humboldt and Bonpland collected a number of their types and various exploring expeditions, such as the ones connected with the "Sulphur" and the "Herald," have made collections. The flora here is extremely interesting and varied,

* Printed with permission of the Secretary of the Smithsonian Institution.

† Upon the recommendation of Mr. F. V. Coville and Mr. David Fairchild, the United States Department of Agriculture gave financial assistance towards this investigation.

due to diversity of habitat, for on one side of the city runs the Guayas, a magnificent river which drains the western ranges of the Andes of Ecuador, while on the other side a great salt lagoon, bordered with all kinds of saline vegetation, pushes up from the ocean. Strange to say, through the bushes of these salt marshes clambers a very remarkable cactus belonging to the genus *Hylocereus*. Then too, a little farther away from the city is an arid belt, where grow thorn-bushes and cacti, and here we discovered one or more arborescent cacti.

From Guayaquil we went by train to the little town of Huigra, located about 70 miles from the coast at an elevation of 4,000 feet above the sea. The town is built on the banks of the Chanchan River and nestles in the narrow valley with high mountains reaching up on each side of it. Huigra, being the headquarters of the Guayaquil and Quito Railway Company, forms a most suitable base from which to carry on botanical explorations. It has a small comfortable hotel which can be used for headquarters and from which excursions can be made by foot or by train up and down the railroad or by horseback into the high mountains either to the north or south. In a few hours one can pass from the semiarid valley about Huigra into the fog-covered forests where the trees are festooned with long masses of delicate mosses and liverworts, with epiphytic ericaceous plants and with climbing species of *Oxalis*, *Viola* and *Solanum*. Or one can drop down the Chanchan Valley by gravity on a hand-car and, in a few hours, be in the midst of a luxuriant tropical vegetation, surrounded by tall graceful palms and bamboos where the moist banks are covered with delicate ferns and beautiful purple-flowered orchids (*Bletia* sp.). In this wet forest is found the red-bark or cinchona tree which is one of the sources of quinine (Fig. 1, plate 235). In this same region, too, were found a little-known *Zamia* (*Z. Lindenii*), an arborescent ivory-palm, and a *Marcgravia* with curious bottle-shaped bracts on the flower stalks, each used as a home by a mountain bee.

We used Huigra for our base for the entire season, making side trips from time to time, once going to Ambato, which is located between the two high ranges of the Andes. This is

the city in which Richard Spruce spent so much time when in Ecuador and from which he wrote many of his fascinating letters. It is in a treeless region, thickly populated, with the land under a high state of cultivation. It is the chief fruit-growing region of Ecuador and nearly all kinds of temperate and tropical fruits are sold. Here we were the guests of Professor Abelardo Pachano, of the Quinta Normal, and here we also met the Martinez brothers, men of science and influence in Ecuador.

At another time we went from Huigra to Quito, from which we made side trips, going once as far north as San Antonio in quest of a new *Opuntia* which had been reported by the veteran naturalist, Ludovic Soederstrom. A species of *Gunnera*, near *G. scabra*, which was in cultivation at the American Legation at Quito, is shown in Figure 2, Plate 235. The gunneras of Ecuador are very ornamental and interesting, but are little understood and deserve careful study.

Our most extended trip was into southern Ecuador, on which occasion we were accompanied by Professor Pachano. Here we traversed Humboldt and Bonpland's route along the interandean valley. The road, which is only a trail, is almost impassable a great part of the year and we found it extremely bad even at the end of the dry season.

We went from Huigra via Cañar and Azogues to Cuenca, where we spent nearly a week. During that time we visited Baños, another of Humboldt's localities, where there are hot springs and a remarkable outcrop of marble. From Cuenca we went via Cumbe, Nabon, and Oña to Loja, all localities mentioned by Humboldt. At Loja we spent four days and then went down to Portovelo across a very remarkable semiarid valley, the Catamayo, where we found a number of strange cacti, including *Cactus lanatus* and *Cactus laetus** of Humboldt. At Portovelo are located the mines of the South American Development Company. It is a very beautiful little town with modern improve- and an up-to-date American hospital with an American doctor and nurse. Here we were the guests of the general manager and his wife, Mr. and Mrs. Andrew Mellick Tweedy. This is

* *Lemaireocereus laetus* (H.B.K.) Britton and Rose.
Cactus laetus H.B.K., Nov. Gen. et Sp. **6**: 68. 1823.

a most interesting orchid region and we made two excursions into the neighboring mountains with Dr. and Mrs. Greenwood in search of rare species with whose haunts they are very familiar. The most conspicuous one was a species of *Cattleya*, which grew in great purple clusters in tall trees, usually in inaccessible places.

From Portovelo we went west across the western Andes to Santa Rosa near the coast where we took a little steamer up to Guayaquil and then went back by rail to our base at Huigra. We remained about two weeks longer in Huigra and its vicinity, then packed our collections and outfit into twenty-eight boxes, trunks, and packages and bade farewell to Ecuador.

We left Guayaquil on November 8, spent one day at anchor off Manta, Ecuador, and, going by way of Panama, Haiti, and New York arrived in Washington December 4, having been away nearly five months.

It is impossible to give in a few lines a very clear idea of the varied flora of Ecuador, extending as it does from the tropical coast of the Pacific Ocean to the everlasting snows of Chimborazo. My collection of some two thousand numbers represents only a small part of this large and varied flora. Perhaps a brief account of some of the families and most striking genera would be of interest and value.

The Cactaceae of Ecuador have heretofore been little known, only some ten or twelve species having been reported. I collected forty-four numbers representing some thirty species, ten of which, at least, are new to science. It is rather remarkable to find so many large and even arborescent species undescribed.

The grasses are very many and extremely diverse, for in the high Andes are found the delicate little species of *Poa* and in the valleys of the foothills are found giant bamboos, nearly a foot in diameter. These giant bamboos form a very important article of commerce and are used everywhere on the coast and in the foothills in the construction of the native houses and even the churches and better type of residences. In the mountains there are two bamboos with solid stems which are used in building fences and in forming the framework of mud houses. I have been unable to identify either of these.

Figure 1. Cinchona tree with bark removed.

Figure 2. Gunnera cultivated at the American Legation at Quito.

The ferns are very abundant and of many types. In the fog-covered forests are delicate filmy ferns while in the deep valleys of the lower mountains are giant tree ferns whose trunks are used in the construction of houses and for fence posts. In southern Ecuador I collected a species of *Polypodium*, probably new, with large fleshy tubers like those of *Polypodium bifrons*.

I was very much surprised to find in the mountains of Ecuador one or more species of *Juglans* similar to our own black walnut and also a hybrid of the native and English walnut (Fig. 2, plate 234).

Several species of *Berberis*, some of ornamental value, were seen in the Andes and several species of *Tropaeolum* are common and interesting. The genus *Eupatorium* occurs in many forms in the mountains. Fifty species have been reported from Ecuador. I collected thirty-four species during my trip. In the wooded mountains and on the high paramos there are many species of the heath Family, represented by large shrubs or by low creeping plants, while in the wet forests they occur as epiphytes.

The bleaching of the leaves of *Carludovica palmata* is illustrated in Fig. 1, plate 234. These leaves are used in the region of Azogues for making Panama hats.

We received many courtesies, only a few of which we can mention here. Through the kindness of the Central and South American Cable Company we were able to keep our home people in touch with us all through the trying days at the close of the war when steamer and postal connections were so disarranged. We were under special obligations to Mr. George Powell, long the general manager of the company in Ecuador and to Mr. F. Woodcock, in charge at Colon. Our genial and efficient consul-general at Guayaquil, Dr. Francis W. Goding, was also most helpful. It was only through courtesies extended by him that we were able to ship our living collections home successfully. Mr. Alfred Cartwright, long connected with the British Consular Service at Guayaquil, gave us much valuable information regarding the plants of Ecuador.

While in Ecuador we were the guests of the Guayaquil and

Quito Railway Company and were under many obligations to Mr. John Dobbie, general manager of the road, and to the conductors and railway men generally for courtesies extended. Our genial host, Mr. Edward Morley, of Huigra, not only cared for our bodily wants but sometimes acted as guide and companion on perilous trips into the high mountains.

J. N. Rose.

A LARGE TULIP TREE STRUCK BY LIGHTNING

During the violent thunder-storm on the afternoon of Friday, June 20, when it became so dark that reading was impossible without artificial light, one of the tallest tulip trees in the Garden reservation was struck by a powerful electric discharge and scarred from top to the base, its bark and outer wood layers being thrown off along a slightly winding strip on the north side some five inches wide; a small hemlock-spruce alongside was also affected and the ground beneath the tree was much disturbed. The tree stands near the north end of the hemlock grove, quite in the woods, a few steps east of the path leading from the water-garden to the economic garden, and from this path the effects of the lightning stroke may be observed; it is a hundred feet or more in height, with a circumference of ten feet; its top projects above the surrounding forest.

Lightning has struck a number of trees in the Garden, both isolated and in the woods, from time to time, and whenever a severe thunder-storm comes across the reservation such strokes have come to be expected. Some records of these were made by Dr. MacDougal and discussed by him in *Journal* 3: 131–135. 1902. Record of the loss of the largest pin-oak may be found in *Journal* 7: 154–156. 1906. Many which have been struck have not been recorded. None have survived the injuries received, either dying after a time or becoming so decrepit as to require their removal.

The case here described will be interesting to follow; it is expected that the stricken *Liriodendron* will show signs of its injury within a short time.

N. L. Britton.

BIRDS OF THE BOTANICAL GARDEN

IV. NESTING—1919

The nesting season for most birds has been dry this year, with only one or two violent storms, and the feathered creatures have correspondingly prospered. It is no uncommon sight to see several pairs of thrashers and grosbeaks feeding their young in the Garden. Near the rubblestone bridge there were nests of redstart, Maryland yellow-throat, yellow warbler, red-eyed vireo, song sparrow, phoebe, robin, catbird, red-winged blackbird, flicker, and the usually more retiring nuthatch. The nest of the last was deep in a natural pocket of the smaller tulip-tree that stands next the twin tulips which sentinel the walk to the east and are background for many photographs.

In this vicinity also was the chosen home of the wood ducks and black duck, and they as well fared better than usual, one rearing eleven young, a second eight, and another two. While these families were showing off in the lily pool, a white-fronted goose from the Zoölogical Park came up the river for company. Farther north on the river-walk a ruby-throated hummingbird hung her cradle and sang her lullabies as the shifting winds swung the slender branch that near its very tip bore this precious beauty and her little ones. This nest looks like a knot in shape, but it is not the color of one, nor is it always covered with lichens. Its diminutive size would alone make it inconspicuous, but, once directed, the eye has no trouble in finding it. When the mother bird returned to the nest she would, if she discovered observers, hover repeatedly about a leaf as if to distract attention, and then dive suddenly into the nest. A woodpecker's hole served to shelter a screech owl. It was well to the top of the largest sycamore tree, just above the bridge at the north end of the Garden. Oriole, veery, and wood thrush nests were plentiful, and scarlet tanager and meadowlark remained through the nesting season.

After a winter that gave it Acadian owl, hermit thrush, brown thrasher, sapsucker, grackle, and half a dozen fox sparrows (a one-legged bird among them) as "permanent residents," the Botanical Garden may well be proud of its showing.

FRED F. HOUGHTON.

MEETING OF POTATO PATHOLOGISTS

On June 24–26, Dr. Seaver represented the Garden at the meeting of potato pathologists held on Long Island for the purpose of studying the various experiments conducted there by the state and by the United States Department of Agriculture. The meeting was one of the most important of its kind ever held, since it was attended not only by representatives from many of our own states but also from England, Ireland, Holland, Bermuda and Canada, about ninety in all being in attendance.

The headquarters for the meeting during the first three days was at Riverhead, Long Island. The first meeting was held in the court-house at Riverhead on Tuesday evening, June 24. The address of welcome was given by Mr. Talmage, one of the large potato growers of the Island. Mr. Talmage referred to the fact that plant pathologists are inclined to criticize the farmer for not taking advice more readily. He explained that the reason for this was the fact that many of the farmers felt that the advice was given by a set of men who would starve to death if they had to make a living on the farm, hence their slowness to take up with new suggestions. After introductory remarks by a number of the members, the work for the following day was outlined in detail, which was to consist of an examination of the various experiments being conducted. The transportation facilities, which consisted of about twenty-five autos, were provided on Wednesday by the North side farmers and on Thursday by those of the South side.

On Thursday trips were made as far as Orient on the extreme eastern end of the island, stops being made at intervals for the study of fertilizer tests, immature seed tests, and for the study of the so-called degeneration diseases "mosaic" and "leaf roll." Special interest was shown in the latter, the stock for which was supplied by Mr. P. A. Murphy, of Canada, Mr. E. J. Wortley, of Bermuda, and Dr. H. A. Edson, of the United States Department of Agriculture. An attempt was made to show to what extent the diseases are contagious and the effect of climate as a prerequisite for the diseases. On Wednesday evening a

second meeting was held at the court-house at Riverhead for a discussion of the experiments examined during the day and to outline the work for the next day. A great deal of interest was shown and the meeting continued to a late hour.

On Thursday a trip was made from Riverhead to Bridgehampton, with a number of stops en route, for the inspection of various potato plantations. In the afternoon an outdoor meeting was held at Watermill. At this meeting papers were presented by Dr. Cotton, of England, on plant pathology in England, by Dr. Pethybridge, of Ireland, on conditions in that country with special reference to the "wart disease," by Dr. Quanjer, of Holland, and by Dr. Edson, of Washington. The last two speakers dealt largely with the degeneration diseases, "mosaic" and "leaf roll." The latest work and theories regarding the causes and method of dissemination of these diseases were considered. After discussions of the various papers the party left for New York where the work was continued.

On Friday, Dr. A. B. Stout, of the Garden staff, joined the party for the inspection trip in Nassau County. The party proceeded by railroad from New York City to Mineola, from which transportation by motor cars was provided by Nassau County farmers. The day's itinerary included a visit to Hicks' nurseries at Westbury; an inspection of the truck farm of Mr. S. G. Burke south of Hicksville; a stop of some time at the field laboratory at Greenlawn in charge of Mr. I. H. Vogel, who discussed the work in progress at this field station; lunch at Centreport, with short talks by all the visitors from foreign countries; and then back to railroad stations by way of Cold Spring Harbor and Oyster Bay, with a stop on the estate of Hon. Geo. D. Pratt at Glen Cove. Rain during the afternoon made it necessary to omit the inspection of the potato-mosaic test at Glen Head.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(*Continued*)

Rhododendron giganteum. TALL RHODODENDRON.

Location: North side of Conservatory Range 1.

Horticultural origin.

Rhododendron maximum. GREAT LAUREL.

Location: East bank of west lake. West end of Stone Bridge.

Natural distribution: Eastern North America.

Rhododendron praecox. EARLY RHODODENDRON.

Location: Fruticetum.

Hybrid.

Rhododendron purpureum var. **elegans.** SHOWY PURPLE RHODODENDRON.

Location: North side of Conservatory Range 1.

Horticultural origin.

Rhododendron roseum var. **elegans.** SHOWY ROSE RHODODENDRON

Location: North side of Conservatory Range 1.

Horticultural origin.

In addition to the above the following, of horticultural origin, are in the collections: Abraham Lincoln, Boule de Neige, Caractacus, Charles Bagley, Charles Dickens, Edward S. Rand, Gen. Grant, H. H. Hunnewell, H. W. Sargent, James Bateman, Kettledrum, Lady Armstrong, Milton, Mrs. C. H. Sargent, Mrs. H. Ingersoll, Mrs. Milner, Parson's gloriosa, Parson's grandiflora, R. S. Field, Sefton.

Biltia. BILTIA

Biltia Vaseyi. VASEY'S AZALEA.

Location: Fruticetum.

Natural distribution: North Carolina.

Azalea. AZALEA

Azalea amoena. PLEASING AZALEA.

Location: Fruticetum. Flower beds north of Conservatory Range 1.

Horticultural origin.

Azalea amoena var. **Dainzo.** DAINZO AZALEA.
Location: Fruticetum.
Azalea amoena var. **Hinodegiri.** FIREFLY AZALEA.
Location: Fountain in front of Museum. Fruticetum.
Azalea amoena var. **Mikado.** MIKADO AZALEA.
Location: Fruticetum.
Azalea amoena var. **splendens.** SHOWY AZALEA.
Location: Fruticetum.
Azalea arborescens. SMOOTH AZALEA.
Location: Fruticetum.
Natural distribution: Eastern United States.
Azalea canescens. MOUNTAIN AZALEA.
Location: Fruticetum.
Natural distribution: Eastern United States.
Azalea coccinea var. **speciosa.** SHOWY ORANGE AZALEA.
Location: Conservatory bed no. 9.
Horticultural origin.
Azalea Daviesii. DAVIES' AZALEA.
Location: Conservatory bed no. 10.
Horticultural origin.
Azalea Kaempferi. KAEMPFER'S AZALEA.
Location: Fruticetum.
Natural distribution: Japan.
Azalea ledifolia var. **alba.** WHITE CHINESE AZALEA.
Location: Fruticetum.
Natural distribution: China.
Azalea ledifolia var. **Fuji Manyo.** FUJI MANYO AZALEA.
Location: Fruticetum.
Azalea ledifolia var. **narcissiflora.** YODOGAWA AZALEA.
Location: Fruticetum.
Azalea linearifolia. LINEAR-LEAVED AZALEA.
Location: Fruticetum.
Natural distribution: Japan.
Azalea lutea. FLAME AZALEA.
Location: Fruticetum.
Natural distribution: Eastern United States.

Azalea nudiflora. WILD HONEYSUCKLE.

Location: Fruticetum. Triangle near west end of West Lake.

Natural distribution: Eastern United States.

Azalea nudiflora var. **alba.** WHITE WILD HONEYSUCKLE.

Location: Fruticetum.

Azalea occidentalis. WESTERN AZALEA.

Location: Fruticetum.

Natural distribution: Western North America.

Azalea sinensis. WOOLLY AZALEA.

Location: Fruticetum.

Natural distribution: China and Japan.

Azalea viscosa. SWAMP HONEYSUCKLE.

Location: Near Boulder Bridge.

Natural distribution: Eastern United States.

The following azaleas, of horticultural origin, are also in the collections: alta Clarence, Beaute coeleste, Bouquet Flore, Dominica Scassi, Hollandia, J. C. Van Tol, Nancy Waterer, Pallas, Raphael de Smet.

Menziesia. MENZIESIA

Menziesia pilosa. MINNIE-BUSH.

Location: American Wood Garden.

Natural distribution: Pennsylvania to Georgia.

Dendrium. SAND MYRTLE

Dendrium buxifolium. SAND MYRTLE.

Location: Fruticetum.

Natural distribution: New Jersey to Florida.

Kalmia. LAUREL

Kalmia angustifolia. SHEEP LAUREL.

Location: Fruticetum.

Natural distribution: Northeastern North America.

Kalmia latifolia. MOUNTAIN LAUREL.

Location: Fruticetum. East bank of West Lake south of the bridge. West end of Boulder Bridge.

Natural distribution: Eastern North America.

Enkianthus. ENKIANTHUS

Enkianthus campanulatus. BELL-FLOWERED ENKIANTHUS.

Location: Fruticetum.

Natural distribution: Japan.

Enkianthus perulatus. JAPANESE ENKIANTHUS.

Location: Fruticetum.

Natural distribution: Japan.

Chamaedaphne. LEATHER-LEAF

Chamaedaphne calyculata. LEATHER-LEAF.

Location: Fruticetum. Bank at east end of West Lake, south of bridge.

Natural distribution: Northern North America.

Leucothoë. LEUCOTHOË

Leucothoë Catesbaei. CATESBY'S LEUCOTHOË.

Location: Fruticetum. Fountain in front of Museum.

Natural distribution: Virginia to Tennessee and Georgia.

Eubotrys. EUBOTRYS

Eubotrys racemosa. SWAMP LEUCOTHOË.

Location: Aquatic Garden.

Natural distribution: Southeastern United States.

Eubotrys recurva. MOUNTAIN LEUCOTHOË.

Location: Fruticetum.

Natural distribution: Virginia to Alabama.

Pieris. PIERIS

Pieris floribunda. MOUNTAIN FETTER-BUSH.

Location: Fruticetum. Fountain in front of Museum.

Natural distribution: Virginia to Georgia.

Pieris japonica. JAPANESE PIERIS.

Location: Fruticetum. Fountain in front of Museum.

Natural distribution: Japan.

Neopieris. STAGGER-BUSH

Neopieris mariana. STAGGER-BUSH.

Location: Fruticetum.

Natural distribution: Southeastern United States.

NOTES, NEWS AND COMMENT

Professor W. C. Coker, of the University of North Carolina, was at the Garden during a part of July consulting the library and mycological collections.

Dr. Charles E. Fairman, of Lyndonville, New York, spent the first part of July studying certain collections of fungi in the herbarium of the Garden. He is preparing manuscript for North American Flora.

Mrs. S. W. Wheeler, curator in the Department of Botany at the Agricultural College at Amherst, Massachusetts, recently called at the Garden to look over specimens of the powdery mildews in connection with her work on the species occurring in Massachusetts.

Seventy pupils and teachers from the Jewish School at 500 East 140th Street visited the Garden July 9, to study the economic collections in the museum building and living plants in certain parts of the grounds, under the guidance and instruction of four members of the Garden Staff.

Mr. Edgar L. Dickerson, of New Brunswick, New Jersey, visited the Garden on June 30 to study the blue willow beetle, which is attacking various species of willow and poplar on the grounds of the Garden. Mr. Dickerson and Mr. Weiss made a special study of this insect a few years ago, soon after its introduction into this country from Europe.

Meteorology for June.—The total precipitation for the month of June was 1.14 inches. The maximum temperatures recorded at the Garden for each week were *94° on the 2d*, 87° on the 13th, 88° on the 22d, and 93° on the 24th. The minimum temperatures were 54° on the 9th, 52° on the 13th, *47° on the 23rd*, and 48° on the 29th.

The rhododendron lace bug, so destructive to rhododendrons in this region, has appeared on mountain laurel planted near rhododendron. As the leaves are thinner, the effect is quickly noticed and the plants soon become brown and unsightly. Careful and repeated spraying with nicotine solution or kerosene emulsion is the only remedy. The bugs collect in large numbers on the under sides of the leaves. To the unaided eye they appear as animated fish scales, while under a hand lens their lace-like character becomes strikingly manifest.

Professor H. M. Fitzpatrick, of Cornell University, visited the Garden several times in July in connection with efforts that are being made by the U. S. Department of Agriculture to stamp out the potato wart disease. This is one of the most dangerous diseases of Irish potatoes known. Rough, spongy outgrowths of varying size are produced on the tubers, especially at the eyes. These warts are light-brown at first, but become black and decayed with age. Sometimes all the potatoes in affected hills are worthless. Fortunately the disease does not attack the vines above ground.

Professor Bernhard E. Fernow, formerly chief of the Division of Forestry of the United States Department of Agriculture and later director of the New York State College of Forestry at Cornell University, has retired from the position of dean of the Faculty of Forestry at the University of Toronto, held by him since 1907. Dr. Clifton D. Howe, a brother of Dr. Marshall A. Howe of the Garden, has been appointed acting dean. Dr. Howe was a member of the Garden's collecting expedition to Nova Scotia and Newfoundland in the summer of 1901.

The following botanists have recently registered in the library: Mr. Arthur D. Cotton, Kew, England; Mr. George H. Pethybridge, Dublin, Ireland; Professor C. R. Orton, State College, Pa.; Professor R. Kent Beattie, Washington, D. C.; Professors C. H. Myers, W. W. Rowlee, and F. P. Bussell, Ithaca, N. Y.; Professor

J. B. S. Norton, College Park, Md.; Professor Frederick H. Blodgett, Danbury, Conn.; Charles E. Fairman, M. D., Lyndonville, N. Y.; Frère G. Arsène, Philadelphia, Pa.; Mrs. S. W. Wheeler, Amherst, Mass.; Professor Alexander W. Evans, New Haven, Conn.; Dr. Ralph G. Mills, Peking, China; Professor Kingo Miyabe, Sapporo, Japan; Professor W. C. Coker, Chapel Hill, N. C.; Dr. Felipe García Cañizares, Havana, Cuba; Dr. Stephen C. Bruner, Santiago de las Vegas, Cuba; Dr. Hernfrid Witte, Svalöf, Sweden; Dr. Ivan Jörstad, Kristiania, Norway; and Miss Anna Whitman Clark, Binghamton, N. Y.

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SOME FICTITIOUS BOTANISTS

It is difficult to believe that, in this day of enlightenment, standard works of reference should contain purely fictitious accounts of scientists who, if they ever existed, certainly never did nor wrote those deeds and writings with which they are credited. Yet it is true that when, about thirty years ago, "Appleton's Cyclopedia of American biography" was published, a considerable number of such spurious sketches crept into this work, otherwise so authentic. Whether these biographies were "original" contributions to the cyclopedia just mentioned, or were copied from some Spanish-American source, I do not know, but I have failed to trace them to any earlier printed accounts.

At first these products of the vivid imagination of some gifted writer—for they bear internal evidence of no small degree of ingenuity—were ignored, and did no particular harm. But during the last few years they have been making an impression upon the literature of scientific biography and bibliography, and it has become very necessary to expose their true character, which has been known to me for many years.

It is impossible for me to say how many of these fictitious biographical accounts are included in the cyclopedia, but I have selected fourteen of them which, by reason of the claim that their subjects were famous botanists, I am in a position to brand as false. The number of similar sketches of men who are erroneously said to have devoted attention to other branches of science is probably considerable, but I cannot make such definite assertions about them. And I have omitted several of the so-called

"botanists" that I believe to be in the same class, but about whom there might remain some room for doubt, such as Davila, Goicoechea, Pereira and Pierola.

Behold, then, the fairy-tales:

IGOLINO, Giuseppe (e-go-le'-no), Italian botanist, b. in Florence in 1759; d. there in 1833. He came to the United States in 1803 on a scientific mission, and remained till 1807 as Italian vice-consul in North Carolina. He sent to Europe several cases of seeds, and discovered some new gramineals, which he described afterward in his "Agrostographia" (Florence, 1824). He was relieved from his consular duties in 1807, but two years later was appointed consul at Buenos Ayres. During his stay in the United States his attention was called to the Mexican hieroglyphs, which had already occupied the attention of many distinguished men of science, and it is asserted that he found a key to them, but lost the manuscript among others when he was shipwrecked in the Straits of Bonifacio on his return to Genoa in 1808. He was the first European to study the anthropology of America, and thus led the way to the work of Darwin, Boyer, De Quatrefages, and Brasseur de Bourbourg. During his stay in South America in 1809–'19, Igolino formed a rich collection of plants and engravings of animals and insects peculiar to those latitudes, studying also the cryptogamic plants of Brazil. He published "Plantae cryptogamae Brasiliae" (Florence, 1829), and read several papers before the Academy of Florence on the "Effects of the Colored Upas," and on the several species of strychnia peculiar to South America. See "Vita illustrissimi Giuseppe Igolino" (Florence, 1841).

[The books credited to Igolino exist; they were by the well-known botanist Giuseppe Raddi (1770–1829), who was, like the fictitious Igolino, a Florentine. Raddi accompanied the Austrian expedition to Brazil in 1817, and returned to Europe in June of the following year; otherwise he was never in America.]

KEHR, Gustav Herman (kair), German botanist, b. in Freysingen in 1581; d. in Magdeburg in 1639. He was professor in the universities of Tübingen and Halle, and afterward librarian of the Prince of Lippe-Detmold, who sent him in 1621 to America to study the plants of that country. Kehr went first to New Spain, and after several years crossed the Isthmus of Panama, and, sailing for Patagonia, studied the plants of the country that is now the Argentine Republic from 1624 till 1629, visiting

afterward Chili, Brazil, and Peru. On his return he published, among other works, "De Sexu plantarum" (Magdeburg, 1631); "Aphorismi botanicae" (Tübingen, 1633); "Historia generalis plantarum Americanarum" (3 vols. Halle, 1635); "Grundlehren der Anatomie und Physiologie der Pflanzen von Amerika" (Magdeburg, 1636); "Sertum Patagonicum et florula peruviensis" (2 vols., Dresden, 1636); "Criptogamae Brasilienses ab Gustavius Kehr collectae" (Magdeburg, 1632); and "Reisen in Amerika" (2 vols., 1639).

[Wholly fictitious. The earliest work on sex in plants was the "Epistola de sexu plantarum" of R. J. Camerarius, published in 1694. The title "Aphorismi botanici" was probably first used in a small volume by C. A. Agardh, commenced in 1817. The Word "cryptogamia" was first coined by Linnaeus, in 1737; "cryptogamae" is a much later form of the same word, perhaps first used after the year 1800. The earliest work on the flora of Peru dates from 1714. The title "Grundlehren der Anatomie und Physiologie der Pflanzen" (without the ridiculous "von Amerika") reappears under "Nascher" below, as does also the "Criptogamae Brasilienses" title. This account of Kehr and his books is the least plausible of all those here reprinted; the dates assigned are so much too early that they would deceive no one in the least familiar with the history of botany.]

KERCKHOVE, Lorenz Wenceslas (kair-ko'-veh), Dutch naturalist, b. in Bois le Duc in 1785; d. in Amsterdam in 1839. He studied in Rotterdam, and early showed a fondness for the natural sciences. At the age of sixteen he joined an uncle who was established in business in New York; but having made the acquaintance of Alexander von Humboldt during his sojourn in the United States in 1802, he gave up business and went to Central America. He had resolved to follow the steps of the German naturalist, and like him write an account of his travels, but after visiting the West Indies, Central America, Louisiana, Mexico, and Guiana, during 1804–'9, his health declined and he was compelled to return to his native land. For several years he was professor of natural history in the University of Leyden, but resigned in 1821 to devote himself exclusively to science, and, settling in Amsterdam, published many works, including "Reisen durch Cuba, Porto Rico, Louisiana, Nueva España und Guiana"

(2 vols., Leyden, 1817); "Historia ecclesiastica et Universalis Guianae" (Amsterdam, 1825); "Die Kriege von 1814–1821 in Mexico" (Leyden, 1833); "Surinam in Bildern und Skizzen" (Amsterdam, 1835); and "Historia plantarum circa Havana sponte crescentium" (3 vols., Amsterdam, 1839).

[Wholly fictitious. It may be remarked that Humboldt, whose acquaintance he is said to have made "in the United States in 1802," spent that year in the Andes; he did not visit the United States until May, 1804. The words "plantarum circa Havana crescentium," which reappear under "Nascher" below, and look reasonable enough, do not occur in the title of any botanical work.]

KJOEPING, Oläus (kyuh-ping), Swedish explorer, b. in Dalecarlia in 1741; d. in Soroe, Denmark, in 1809. He entered the Danish service as military surgeon, and was stationed for several years in the West Indies, also visiting Louisiana, Guiana, and New Spain. In 1796 he became rector of the academy of Soroe. His works concerning America, include "Beschreibung von Guiana" (Soroe, 1797); "Neueste Gemälde von Louisiana und Mississippi" (2 vols., 1792); "Prodromus florae, sistens enumerationem plantarum cellularium quas in insulas, Santo Domingo, Cuba, Sancti Thomae et Sancti Bartholomei a Kjoeping collectas describit" (Copenhagen, 1799); and "Anmärkningar om Planter af Cuba" (3 vols., 1807).

[Wholly fictitious. The name "Oläus" may have been suggested by that of Olof Swartz (1760–1818), the famous Swedish student of the West Indian flora, one of whose works bore the subtitle "Prodromus descriptionum vegetabilium maximam partem incognitarum quae sub itinere in Indiam occidentalem annis 1783–87 digessit" (Stockholm, Upsala, and Aboe, 1788). The list of islands in the title of the imaginary "Prodromus" of "Kjoeping" is reminiscent of such works as West's "Bidrag til Beskrivelse over Ste. Croix, med un kort Udsigt over St. Thomas, St. Jean, Tortola, Spanishtown og Crabeneiland" (Copenhagen, 1793) and Euphrasén's "Beskrifning öfver Svenska vestindiska ön St. Barthelemi, samt öarne St. Eustache och St. Christopher" (Stockholm, 1795), both of which contain accounts of plants.]

KOEHLER, Alexander Daniel (kuh-ler), German botanist, b. in Altenkirchen, Rügen island, 18 April, 1762; d. in Langen-

branden, Würtemberg, 6 Dec., 1828. He inherited from his father an independent fortune, and occupied himself with botanical studies. A letter from Alexander von Humboldt, then in America, determined him to make that country the field of his studies for several years, and he went in 1801 to Santa Fé de Bogotá, and was for seven years a collaborator of José Mutis, the Spanish botanist. On his suggestion, Mutis established in 1801 an astronomical observatory in Santa Fé, and Koehler provided it with valuable instruments. After the death of Mutis in 1808, he resolved to finish part of the latter's work, and, going to Brazil, made a thorough study of the palm-trees of that country. The civil wars that desolated the northern part of South America at that time put a stop to his explorations, and, passing to Peru, he visited that country, studying also the political institutions of Chili before returning in 1816. He devoted the remainder of his life to the publication of the materials he had collected during his travels, and read several papers before the academies of sciences of Munich and Berlin, of which he was a corresponding member. He kept up also a correspondence with Humboldt, and furnished him with notes and information which the explorer utilized in the revised edition of his travels through America. Among his works are "Reise nach Brasilien" (Stuttgart, 1817); "Wanderungen in Peru und Chile" (2 vols., 1818); "Karte von dem panamischen Isthmus" (Munich, 1821); "Flora Brasiliensis" (4 vols., Berlin, 1821–'3); "Flora Venezuliensis" (4 vols., 1822); "Studien über den öffentlichen Unterricht in Chile" (Stuttgart, 1823); "Reisen durch Nordwest-Venezuela" (Leipsic, 1824); "Genera et species palmarum" (Stuttgart, 1825); "Sertum Peruanum" (2 vols., Berlin, 1826); "Institutiones botanicae" (Stuttgart, 1827); and "Conspectus polygalorum florae Brasilicae meridionalis" (2 vols., Berlin, 1827).

[Wholly fictitious. Some of the bibliography given was evidently suggested by certain publications of Martius (1794–1868) and of Saint-Hilaire (1799–1853), but the titles modified and dates altered.]

LOTTER, Frederic August, German botanist, b. in Kleinaupe, Moravia, in 1741; d. in Gotha in 1806. He studied in Prague, and in 1789 was attached as botanist to the expedition that was sent by the Spanish government around the world under command of Capt. Malaspina. Lotter being taken sick in Concepcion, Chili, was unable to accompany the expedition.

He rejoined it at Acapulco in 1791, but soon left it again and explored the interior of Mexico as far as Lower California. Afterward he visited Peru, Chili, and the Argentine provinces, returning in 1795 to Europe, where he became professor of natural history at the College of Gotha. He published "De Usu et ratione experimentorum in perficiendi historia naturali" (Prague, 1787; revised and enlarged ed., Gotha, 1796); "Vermium fluvialum Americanarum, sive animalium infusorium helminthorum et testaccorum historia" (Gotha, 1796); "Flora Mexicana" (2 vols., 1798); "Flora Peruana" (2 vols., 1800); "Reisen durch Mexico und Süd-Amerika" (2 vols., 1801); "Compendium plantarum sponte crescentium circa Conceptium in quo familiae per tabulas disponuntur" (2 vols., 1802); "Icones plantarum Americanarum rarium" (2 vols., 1803); and several less important works.

[Wholly fictitious. The botanists of the Malaspina expedition were Thaddäus Haenke and Luis Née.]

MORTIER, Edouard Louis (mor-te-ay), French naturalist, b. in Mulhouse in 1801; d. in Rio Janeiro in 1852. He was sent in 1835 on a scientific mission to South America, and explored the Guianas, the United States of Colombia, Venezuela, Peru, and Brazil, returning to France in 1840. In 1843 he settled in Brazil, and became professor of botany and natural history in the College of Rio Janeiro, which post he held till his death. He published "Des origines des Indiens habitant l'Amérique du Sud" (Paris, 1841); "Traité du tabac et du cacao" (1841); "Historia plantarum circa Cayenne sponte crescentium" (1843); "Prodomus florae Brasilicae, sistens enumerationem plantarum cellularium quae in insulâ Santa Catilina crescent" (2 vols., Rio Janeiro, 1849); "Historia generalis plantarum Americanarum in qua familiae per tabulas disponuntur" (2 vols., 1850); and several other works.

[Wholly fictitious.]

NASCHER, Friedrich Wilhelm (nash'-er), German naturalist, b. in Newent, England, in 1702; d. in Paderborn, Westphalia, in 1764. He was a merchant, resided several years in Havana, and, having made a fortune, followed his taste for travel, visiting Brazil and most of the Spanish possessions. On his return to Germany in 1752 he obtained employment at the court of the Prince of Reuss-Greitz, but, resigning a few months later, devoted the remainder of his life to the arrangement and publication of the material he had collected during his travels.

He published "Reisen in Südlichen Amerika" (2 vols., Dresden, 1754); "Neueste Reisen durch Amerika" (2 vols., 1755); "Grundlehren der Anatomie und Physiologie der Pflanzen" (2 vols., Berlin, 1756); "Neueste Geschichte und Beschreibung des Brodbaums" (1758); "Flora Cubana, exhibens characteres generum et specierum plantarum circa Havana crescentium" (2 vols., Leipsic, 1758); "Criptogamae Brasilienses ab Nascher collectae, cui additus lexicon in quo terminis artis breviter exponuntur" (1760); "Bilder und Skizzen der Umgebungen von Havana" (Berlin, 1762); "Land und Leute der Insel Cuba" (1762); and several other works.

[Wholly fictitious. Comments upon some of the titles are given above under "Kehr" and "Kerckhove." One title was evidently suggested by Forster's "Geschichte und Beschreibung des Brodbaums" (1784), but why a "German naturalist" who resided and traveled in the American tropics should have written upon such a subject in 1758 does not appear. The breadfruit tree is widely distributed in the islands of the Pacific, but was first introduced into tropical America in 1793; an expedition sent to the Pacific by the British government succeeded in landing living trees at St. Vincent and Jamaica in that year.

NEÉ, Isidore Charles Sigismond (nay), West Indian botanist, b. in St. Martin, W. I., in 1784; d. in Paris, France, in 1837. He received his education in New Orleans, returned in 1808 to the West Indies, and in the spring of 1810 went to South America. After visiting Guiana and the important cities of Brazil, he sailed for Lima, explored the Andes, and ascended the volcanoes Pichincha and Chimborazo. In 1814 he went to Mexico, where he sojourned several years, devoting his time to researches in libraries. He then settled in France and published "Flora Mexicana, seu genera et species plantarum quae in Mexico Crescent" (2 vols., Paris, 1827); "Les volcans des Andes de l'Equateur; une ascension du Pichincha et du Chimborazo" (1829); "Mémoire sur les hiéroglyphes Mexicains" (1830); and "Etudes sur l'analogie de l'écriture cunique et des hiéroglyphes Egyptiens et Mexicains" (1832).

[The name is evidently in part compounded from those of Carl Sigismund Kunth (1788–1850) and Luis Née, both well-known botanists; but the rest of the sketch is wholly fictitious.]

RAMÉE, Stanislas Henri de la (rah-may), French naturalist, b. in Périgueux in 1747; d. in Fontainebleau in 1803. He studied medicine and botany in Toulouse, and at the age of twenty had formed a valuable herbarium of the flora of Languedoc, when he went to Paris to study under Buffon, whom he assisted for several years in the Royal botanical garden. In 1783 he was sent to Peru to study the effects of cholera, which then was raging in Callao, and he visited afterward the Andes of Peru, Central America, the Isthmus of Panama, Cuba, and several of the West Indies, returning with valuable collections in natural history. His works include "Nova Systema Naturae" (2 vols., Paris, 1792); "Monographie des drogues et médicaments simples de l'Amérique du Sud" (1794); and "Prodome des plantes recueillies en Amérique et dans les Indes Occidentales" (1798).

[Wholly fictitious.]

SYLVIE, Édouard (sil-vee), French naturalist, b. in Riom, Auvergne, in 1670; d. in Lyons in 1739. He studied in the College Louis le Grand at Paris, entered the church, and was appointed by the king to a rich abbey in Lyons. Devoting his leisure time to the study of mathematics and natural history, he presented several valuable memoirs to the Academy of sciences, which induced that body to propose him to the king for a mission to South America. Louis XIV. placed a man-of-war at Sylvie's disposal in order to facilitate his work, and from 1701 till 1703 he visited Santo Domingo and several ports of the Caribbean sea, prepared a chart of the Gulf of Mexico, and made valuable observations. In the following year he visited Guiana, Brazil, Montevideo, and Buenos Ayres, landed on Staten island, and made the ascent of its snowy range of mountains. Doubling Cape Horn, he coasted Chili and Peru to Callao, and, penetrating into the interior, explored the Andes. Sylvie afterward returned to the West Indies, and sojourned several months in Santo Domingo, occupied in drawing a map of the French part of the island. His vessel arrived at La Rochelle, 15 Oct., 1710, and Sylvie's valuable collections were presented to the Academy of Sciences, which elected him a corresponding member. His works include "Explications de l'herbier et des collections rapportées d'Amérique par l'Abbé Edouard Sylvie" (3 vols., Paris, 1711–'13); "Relation d'un voyage de la mer du Sud aux côtes de la Guiane, du Brésil, de la Terre des Etats, du Chili et du Pérou, avec une description de la côte septentrionale du détroit de Le Maire" (3 vols., 1714–16); "Voyage à travers le Golfe du Mexique, suivi d'une

description des îles Antilles de l'Amérique, et en particulier de l'île de Saint Domingue" (2 vols., 1720–'1); and "Journal des observations d'un voyage au Pérou et au Chili" (5 vols., 1726–'8).

[A much garbled account, with changes of names and dates, and distortion of other facts, of the life of Louis Feuillée (1660–1732), of whom a more or less reliable account appears in its proper place in the same cyclopedia.]

THIBAUDIN, Gaston Louis (tee-bo-dang), French explorer, b. in Dunkirk in 1727; d. in Lima, Peru, in 1796. He studied botany in Paris under Buffon, was employed afterward by the Academy of sciences, and at the request of that body was given by Louis XVI. in 1776 a mission to South America. His instructions were to collect in Chili, Peru, and Cuba specimens of medicinal plants that could be naturalized in France. He landed in Concepcion early in February, 1777, journeyed for months through the pampas and the mountains, and formed a rich herbarium. After visiting Santiago and the large cities, he went to Callao, making also a voyage to the island of Juan Fernandez. Toward the end of 1780 his herbarium numbered about 1,500 specimens, including many new ones, when he left for the West Indies, but, owing to the war that then raged in the Gulf of Mexico between France and England, he remained at Carthagena occupied in arranging his collections till the truce of 1782. Then he resumed his voyage and went to Havana, where he formed a nearly complete collection of the flora of the island. On his return to France in 1785 he was elected a corresponding member of the Academy of sciences, and that body undertook also the publication of his works. He had made many friends in Peru, and, feeling insecure in Paris during the revolution, he returned in 1792 to Lima, where he taught mathematics till his death. Thibaudin's works include "Description des plantes recueillir dans un voyage au Pérou et au Chili" (2 vols., Paris, 1786); "Mémoire sur la flore de l'île de Cuba" (1786); "Prodome de la flore du Chili avec herbier explicatif" (4 vols., 1788); and "Prodome de la flore du Pérou avec herbier explicatif" (4 vols., 1790).

[Wholly fictitious.]

VIVIER, Jacques du (veev-yay), French naturalist, b. in Lorient, France, in 1720: d. there in 1793. He studied botany in Paris, held an office in the laboratory of the Academy of sciences, and sailed as secretary of a commission that was sent to South America to measure an arc of the meridian under Charles

Marie de la Condamine. When the authorities of Lima induced some of the mathematicians to stay in South America, Vivier remained with Jean Godin, was employed in opening sulphur-mines at Cochabamba, and held for some time the chair of botany and mathematics in the College of Lima. In 1781 he obtained permission to return, and he embarked at Cayenne in 1782. On his arrival at Paris he vainly sought to recover his former place in the laboratory of the Academy of sciences, and for some time lived in poverty, until he obtained a place in the library of the Duke of Penthièvre. His published works include "Nova genera et species plantarum quas in America, Jac. Vivierus collegit" (3 vols., Paris, 1788–'90) and "Sertum Peruanum" (2 vols., 1792); and his manuscripts contain a "Flora chilensis," which has never been published.

[Wholly fictitious. It may be noted that this extraordinary man, who was born in 1720, was secretary of the La Condamine astronomical expedition, which went to South America in 1736! It is also a bit remarkable that, upon his return from Peru to Europe, he embarked at Cayenne!]

WALLERTON, Charles Louis Auguste, French naturalist, b. in Sainte-Ménéhould in 1721; d. in Nancy in 1788. He was sent to Mexico in 1759 to study the botany of that country, at the suggestion of the Academy of sciences of Paris, and obtained a special privilege to enter the Spanish dominions. Landing in Vera Cruz in October, 1760, he explored the province of Michoacan, where he formed a rich herbarium of medicinal plants, and afterward he searched the public libraries and the convents for information about the remedies that were formerly used by the Aztecs. He then visited the Isthmus of Panama, Santo Domingo, and Cuba, and made a thorough exploration of the latter island. On his return to France in 1765, with an herbarium of 1,500 medicinal plants, he was elected corresponding member of the Academy of sciences, and secretary of the Academy of Nancy, where he settled. He wrote "Traité explicatif d'un herbier de plantes médicinales recueillies dans un voyage à la Nouvelle Espagne, dans l'isthme de Darien et a l'île de Cuba" (3 vols., Nancy, 1767–'70); "Monographie des maladies syphilitiques et des simples en usage chez les anciens Indiens du Mexique" (1770); and "Tableau de la flore du royaume de la Nouvelle Espagne, et en particulier de la province de Méchoacan" (2 vols., 1775–'9).

[Wholly fictitious.]

The element of sameness that characterizes these accounts, not conspicuous when scattered through the volumes of the cyclopedia, but very evident when they are brought together as has been done here, is an added proof, if any were needed, of their spurious character.

And here we have a detailed enumeration of 69 titles, or 125 volumes in all, of *important*—some, *indeed, monumental*—works on America, not one of which is to be found in any of the great libraries of the world. Surely further comment is superfluous.

JOHN HENDLEY BARNHART.

ADDISONIA: ITS PROGRESS AND PUBLICATION

The second part of the fourth volume of the beautiful quarterly publication, *Addisonia*, devoted in accordance with the terms of the bequest of its founder, Judge Addison Brown, to the illustration by colored plates of the plants of the United States and its territorial possessions and of other plants flowering in the New York Botanical Garden or its conservatories, appeared in June. Each part of the work contains ten colored plates, and the total number of plates issued is now one hundred and forty; they are accompanied by descriptive letter-press. Miss Mary E. Eaton has made nearly all of the paintings reproduced and has also painted some four hundred plants not yet published, the illustrations required for another ten years of the journal being thus in hand.

Judge Brown's bequest contains the provision that the work is to be aided by subscriptions. These subscriptions by libraries and individuals now number about 240 at ten dollars annually, and thus yield about $2,400 a year; the income of the Addison Brown fund, established by the bequest, is about $900 per year, and sales of back volumes yield about $300 a year. The annual income is thus about $3,600 and up to the present time this has been sufficient for the publication. Recently, however, the

cost of engraving and of printing have both advanced, and additional subscriptions will be welcomed. A condition of subscription is that it must be made for the whole work commencing with volume 1, and thus requiring an initial cost of $40 at the present time.

Sample copies of the work, which is an ornament to any library, will be mailed on application to the Director-in-Chief. There are also available a considerable number of loose plates which may be distributed. N. L. BRITTON.

AUTUMN LECTURES, 1919

The following program of public lectures has been announced for the autumn of 1919. As usual, they will be held in the lecture hall of the Museum, Saturday afternoons at four o'clock.

August 30. "The Proper Care of Shade Trees and Ornamental Plants," by Dr. Mel T. Cook.

Sept. 6. "Sugar and Cocoa: Their History and Production," by Dr. W. A. Murrill.

Sept. 13. "A Naturalist's Rambles in Florida," by Dr. G. Clyde Fisher.

Sept. 20. "Dahlias and Their Culture," by Dr. M. A. Howe. (Exhibition of Dahlias, Sept. 20 and 21.)

Sept. 27. "Peeps into Gardens," by Mr. Leonard Barron.

Oct. 4. "Autumn Coloration," by Dr. A. B. Stout.

Oct. 11. The Digestion of Vegetable Foods," by Dr. W. J. Gies.

Oct. 18. "Fall Planting and Winter Protection," by Mr. Geo. V. Nash.

Oct. 25. "Conserving the Forests and Wild Life of New York State," by Mr. C. G. Abbott.

Nov. 1. "The Tea Gardens of Ceylon and Japan," by Dr. H. A. Gleason.

NOTES, NEWS AND COMMENT

The Horticultural Grounds were gay during the late summer with an attractive display of many varieties of cannas, bordering

the entrance walk from Southern Boulevard. Beyond them the paths were banked with a large collection of gladioli at the south and perennial phlox at the north, while the eastern end of the area was marked by the mallow garden, which bloomed very well, although newly transplanted into this position. The dahlia collection near the railway station began to bloom early in August and from that time on attracted numerous visitors.

A summer flower show, under the direction of the Horticultural Society, was held in the Museum, August 23 and 24. The leading feature was the display of gladioli, but considerable space was also occupied by cannas, roses, and dahlias.

The three flagpoles at the Garden, in front of the Museum and the Mansion, have received a fresh coat of white paint and gold leaf.

Minor depredations in the grounds have been as numerous as ever this summer in spite of many arrests. Conditions have been especially trying along the Pelham Parkway boundary, which is not protected by a fence.

Prof. E. W. D. Holway, of the University of Minnesota, well known to mycologists through his extensive work on plant rusts, called at the Garden recently on his way to South America, where he expects to spend several months collecting rusts and other plants in Chile and Argentina.

Dr. J. K. Small, Head Curator of the Museum, has recently made two trips into Perry County, Pennsylvania, to secure living plants and photographs of the rare huckleberry, *Gaylussacia brachycera*. The species is known to exist in only two localities, the second being in Delaware. In the Pennsylvania station, the plants extend over an area of several acres, with the stems connected underground, so that the whole assemblage may justly be called a single plant. From Dr. Small's collections Miss M. E. Eaton has made paintings, which will be published in *Addisonia*.

Mr. George V. Nash, Head Gardener, lectured on "Rose Gardens" before the Rumson Garden Club, Rumson, New Jersey, August 5.

Meteorology for July.—The precipitation for the month at the New York Botanical Garden was 4.44 inches. The maximum temperatures recorded for each week were *100° on the 4th and 5th*, 85° on the 8th and 14th, 93° on the 27th, and 96° on the 28th. The minimum temperatures were *54° on the 9th*, 64° on the 15th, and 60° on the 26th and 30th.

Work on the new coal bunkers at Power-house 1 has been pushed through the summer and they will be ready to receive coal during the autumn delivery. They are built with masonry walls and reinforced concrete roof, and approximately quadruple the storage capacity at the power-house. All the work has been done by Garden employees, under the direction of Superintendent A. J. Corbett.

Dr. A. D. Cotton, plant pathologist of the Board of Agriculture, London, and formerly in charge of the collection of algae at the Royal Gardens, Kew, visited the Garden August 16 and gave much interesting information relative to botanical and horticultural conditions in England. It was satisfactory to learn that neither has been seriously restricted on account of the war, but sad to know that a number of highly promising young men had been killed in action, and these it is impossible to replace.

A large collection of herbarium specimens made by Mr. W. C. Fishlock, agricultural instructor for the British Virgin Islands, on the islands Tortola, Virgin Gorda, and Anegada has recently been received and studied at the Garden. It adds much to our knowledge of the distribution of species occurring also in the American Virgin Islands and in Porto Rico, and comes in good time to have this information included in the botanical part of the reports on the scientific survey of Porto Rico and the Virgin Islands for publication by the New York Academy of

Sciences. Mr. Fishlock aided Dr. Britton greatly during his visit to these islands in the spring of 1913 (*Journal*, 14: 100-102).

Mr. C. G. Lloyd, of Cincinnati, spent several days at the Garden in August and September examining species of *Xylaria* in the Garden collection in connection with his studies of that genus.

The following visiting botanists have recently enrolled in the library: Professor Howard J. Banker, Cold Spring Harbor, N. Y., Professor Homer D. House, Albany, N. Y., Mr. G. W. Martin, New Brunswick, N. J., Professor E. W. D. Holway, Minneapolis, Minn., and Professor John W. Harshberger, Philadelphia, Pa., with his class in botany at Cold Spring Harbor.

Members of the New Rochelle Garden Club visited the Garden on the afternoon of August 11 and were accompanied on their tour of inspection by Dr. and Mrs. Britton, Dr. Howe, and other members of the Staff. The dahlia border was first inspected, and Dr. Howe gave a brief talk on the selection and cultivation of dahlias, which was followed by questions and discussion. Then the tender and hardy water-lilies in the tanks at Conservatory Range 1 were examined and admired; after which the party visited the display borders of cannas, gladioli, and phlox, and the new Rose Garden. Mrs. Richards, the president, called a meeting of the club at the Mansion at 4 P.M., at which twenty members were present, most of whom remained to see the experiments in plant-breeding being conducted near the Propagating Houses by Dr. Stout.

Dr. W. A. Murrill spent a part of his vacation in July collecting and making field studies of fleshy fungi in the mountains of Virginia, where an unusual number were brought out by the heavy and continuous rains. He also experimented with certain attractive forms for table use. All the way from New York to southwest Virginia, the black locust was found to be badly attacked by a leaf-miner; while the chestnut canker continued to

spread southward and westward; and wilts of tomatoes and other vegetables and rots of plums, peaches, and grapes were abundant and destructive owing to the damp weather. At Lynchburg, a splendid English walnut tree, over a hundred years old, was attacked by a fruit blight which practically destroyed the crop, the ground being covered with blackened and worthless nuts. In the vicinity of Washington, seventeen-year locusts had been abundant, especially on the oaks, and many trees used in decorative plantings had been rendered very unsightly by the death of twigs where eggs had been deposited. Fortunately for us, this insect seems to have skipped Manhattan and The Bronx, although singing this season in twenty states.

About seventy students of the Columbia Summer School visited the Garden on the afternoon of August 8, under the leadership of Mr. L. W. Crawford, Jr., and were escorted through the grounds and buildings by Drs. Murrill, Howe, Barnhart, and Pennell, of the Garden Staff.

Chicago is soon to have, on the outskirts of the city, the most beautiful and extensive botanical gardens, or arboretum, in the world. The Cook County board of forest preserve commissioners decided yesterday to utilize a part of the forest preserve for this purpose. It is likely that 2,000 of the 4,000 acres of the Palos preserve district, southwest of the city, will be chosen as the site.

Already a garden spot, with its deep wooded ravines, its high bluffs overlooking the Desplaines River valley, and its great stretches of green prairie, the Palos district offers a nucleus, in the opinion of the board, from which may be made a scenic marvel where the scientist may revel in botanical wonders while the layman revels in its beauty.

The site, recommended by a subcommittee, of which Prof. Henry Cowles of the University of Chicago and Prof. Chas. B. Atwell of Northwestern University are members, is already 30 per cent. complete, scenically. As trees, shrubs, and flowers from other parts of the world are added, they will be planted in accord with a comprehensive scheme of landscape gardening.

Eventually, greenhouses will be built to grow verdure which otherwise could not exist in this climate. The plans of the commission also call for the ultimate erection there of a museum and a library.

Charles F. Millspaugh, director of the Field Museum, who has visited all but two of the arboretums of the world, after seeing the Palos site declared that Chicago has an opportunity such as no other city has in having such a great area of land near its borders suitable for an arboretum.—*Chicago Tribune.*

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COASTWISE DUNES AND LAGOONS

A RECORD OF BOTANICAL EXPLORATION IN FLORIDA IN THE SPRING OF 1918

[WITH PLATES 230–238]

DR. N. L. BRITTON, DIRECTOR-IN-CHIEF.

Sir: With your approval I devoted several weeks of April and May, 1918, to botanical exploration and investigation in peninsular Florida, and at your request incidentally helped in securing paintings of plants of the Florida flora for illustration in Addisonia. I was accompanied to Miami by Mrs. Small and Elizabeth Small, who attended to the drying of herbarium specimens. At your suggestion, moreover, Miss Mary E. Eaton, artist at the Garden, accompanied us for the purpose of making the paintings above referred to.

Our collecting headquarters were maintained in the laboratory building of the Plant Introduction Garden of the United States Department of Agriculture with the permission of Dr. David Fairchild, and we had the coöperation of Mr. Edward Simmonds, the officer in charge of that station.

All facilities for field work, and for painting as well, were generously put at our disposal by Mr. Charles Deering, who was at personal pains to further our work on every occasion.

Considerable time was consumed in selecting and gathering specimens for painting. For the most part, only those kinds of plants not previously illustrated were selected. As a result of Miss Eaton's rapid and steady work, however, not less than

twenty-eight full-page paintings were secured, or, about an qeuivalent of one painting a day while she was in the field. Only flowering plants were illustrated, including two species of monocotyledons and twenty-six species of dicotyledons. Altogether, they represent twenty natural plant-families and twenty-six genera. Most of the plants illustrated are rare or local in our flora, while four of them are species new to science. Viewed geographically, the four novelties, and thirteen other species, are endemic in Florida; eleven kinds grow also in the West Indies and in Mexico; while two in the latter category range well down into South America.

While gathering specimens for painting from the vicinity of Miami, studies on various problems, begun in previous years, were continued. Investigations among the Florida cacti were continued in our field-work, particularly in connection with problems arising through the monographic work of yourself and Dr. Rose for the Carnegie Institution of Washington.

In passing, it may be of interest to state that several years ago we knew of but seven species of cacti in Florida, these being referred to two genera, four to the genus *Opuntia* and three, of uncertain relationship, to the genus *Cereus*. Our information of this group has so increased, however, that today we have definite knowledge of twenty-four species, these clearly constituting seven genera.

Twelve of these species are flat-jointed and represent the genus *Opuntia*, or prickly pears; while the remaining twelve are of the columnar or climbing kinds and comprise the six other genera. These latter are *Selenicereus*, with two species; *Hylocereus*, with one species; *Acanthocereus*, with one species; *Harrisia*, with five species; *Cephalocereus*, with two species; and *Pereskia*, with one species.

It should be mentioned that this record speaks well not only for the field work done, but for the opportunities afforded by the cactus-plantation in the reservation of Mr. Charles Deering at Buena Vista, Florida. Here we have been able to bring together, grow, and study all the known cacti not of Florida alone, but of the entire eastern United States.

Fantastic woody roots occur in some of the hammocks of the Everglade Keys. The one here illustrated is in the Deering hammock at Cutler and stands about three feet high. It is connected with a pond-apple tree (*Annona glabra*) that stands about ten feet away from it. The particular reason for this aërial section of the root is not apparent.

Stilted trees are common in the hammocks of the Everglade Keys. The roots grow directly on the rock which lies beneath a rather thin layer of humus. The pigeon-plum tree (*Coccolobis laurifolia*) here illustrated is in the Deering hammock at Cutler. Such cage-like structures make ideal homes for wild rodents, and doubtless were used by the Florida-lynx which was plentiful in this hammock until a quite recent date.

A day was devoted to Royal Palm Hammock and the adjacent Everglades.

Here the custodian showed us a peculiar vine he had recently found. It was in both flower and fruit and proved to be a heliotrope-relative (*Tournefortia hirsutissima*). Thus Royal Palm Hammock becomes the second known locality in Florida for this tropical plant, Mr. Mosier and the writer having found the same plant several years ago—in leafage only, however—in the Timms Hammock in the Biscayne Pineland. It is a somewhat woody and very vigorous grower, climbing into the tallest trees and copiously branching. It bears large clusters of rather small white or cream-colored flowers of a pleasing fragrance, which later develop into clusters of globular fruits. These fruits are from a quarter to a half-inch in diameter and resemble large pearls.

While on the subject of the Royal Palm Hammock, it may be remarked that both this and the Deering Hammock at Cutler exhibit an exceptionally large number of what might be called "stilted" trees—that is to say, trees, either small or large, the trunks of which are elevated on a conoidal structure of exposed roots. The reasons for this are local.

It appears that when the tree starts as a seedling the roots of necessity spread out horizontally, or nearly so, in the almost pure humus which takes the place of soil over the rough rock floor of the hammocks, and that some of the main roots grow close to or against the rock. Now, under favorable conditions of temperature and moisture, it would appear that these roots grow too fast to adjust themselves to the subsurface irregularities, as they naturally would in ordinary soil. Hence the pressure against the obstructing rock causes the trunk to be pushed up vertically. The process continues. The early roots put out branches and new roots are formed, and these gradually elevate the base of the trunk, sometimes to a height of two or three feet. Incidentally, the cage-like structures with sides at an angle of 45°, which are thus formed by the exposed roots, are extensively used as houses by rodents. (See accompanying plate.)

In this connection, there is one remarkably fantastic root in

the Deering Hammock at Cutler. It is that of a pond apple tree (*Annona*), but it appears far from the trunk of this. Either it encountered an obstruction or grew with such exceptional rapidity in one direction that it left the ground altogether and started up into the air. There it curved about, finally forming a cage-like structure fully a yard high and quite isolated from other shrubs or trees. (See accompanying plate.)

The occurrence of the mangrove (*Rhizophora Mangle*) near Royal Palm Hammock[1] has already been recorded. Additional specimens have been found a short distance from the hammock. They are vigorous and are even spreading in spite of prairie fires. They grow in absolutely fresh water, being situated not only twelve miles from the Bay of Florida, but in a place where the superficial flow and the underground pressure of the water from the Everglades is directly against the possibility of the presence of salt water.

On another day we made an excursion to Hammer Key, a high hammock island lying in the Everglades about fifteen miles southwest of Royal Palm Hammock. To reach this we traversed a prairie on which both showy and inconspicuous orchids were plentiful—respectively, the grass pink (*Limodorum*) and ladies'-tresses (*Ibidium*). More conspicuous than all the other plants, however, was the yellow heliotrope (*Heliotropium Leavenworthii*) which grew by the acre, and with it were bright-red milkweeds (*Asclepias*), low milkworts (*Polygala*), marsh pinks (*Sabbatia*), diminutive bladderworts (*Utricularia*), and butterwort (*Pinguicula pumila*).

Midway on our journey we crossed Burnt-Pine Island—a well-named locality, for there was nothing left of it but a ragged reef with some blackened poles standing here and there. This was once an outlying Everglade Key; but the prairie fires that are largely started by the mighty hunters that infest the region have wiped it off the map. Whatever broad-leaved shrubs and trees, not to mention herbaceous vegetation, that once clothed the island have been utterly destroyed, and except for the charred poles the area has reverted to mere everglade-prairie.

[1] R. M. Harper in The Florida Review 4: 154, 155. 1910.

Farther on, small rocky reefs isolated in the Everglades indicated the position of former hammocks. (See accompanying plate.) These, evidently once clothed with shrubs and trees growing in the accumulated humus, are now bare ragged rock nearly or quite devoid of even the common everglade vegetation.

Burnt-Pine Island, Hammer Key, and neighboring hammock islands, both extant and extinct, are interesting as indicating a natural chain of connection between the Cape Sable region and the main body of the Everglade Keys. When the territory for a dozen miles on either side of the Dade-Monroe county line becomes accessible, the gradation between the floras of the Everglade Keys and Cape Sable, as well as the relation of both of these floras to that of the lower Florida Keys, to which they are both related, will doubtless present many interesting problems.

Although Hammer Key is widely separated from the Long Key Pineland, and is surrounded by the Everglades, it is not an Everglade hammock, but is almost identical with the high pineland hammocks of the Everglade Keys. It is on an elevated rocky foundation. Many of the typical high-pineland hammock trees are there, the wild tamarind (*Lysiloma*) and butter-bough (*Exothea*) being very abundant. The characteristic shrubs, vines, and herbs also grow there.

Unfortunately, a drenching rain came up before we reached the Key and continued with more or less severity until we got back to Royal Palm Hammock. We and our luggage were thoroughly drenched, except our camera. This, of course, we had to protect at the expense of everything else, even if it was useless baggage just then.

During a general and extensive collecting trip into the northern part of the lake region an attempt was made to get into the district west of Lake George for the purpose of rediscovering a prickly-pear reported from there many years ago.

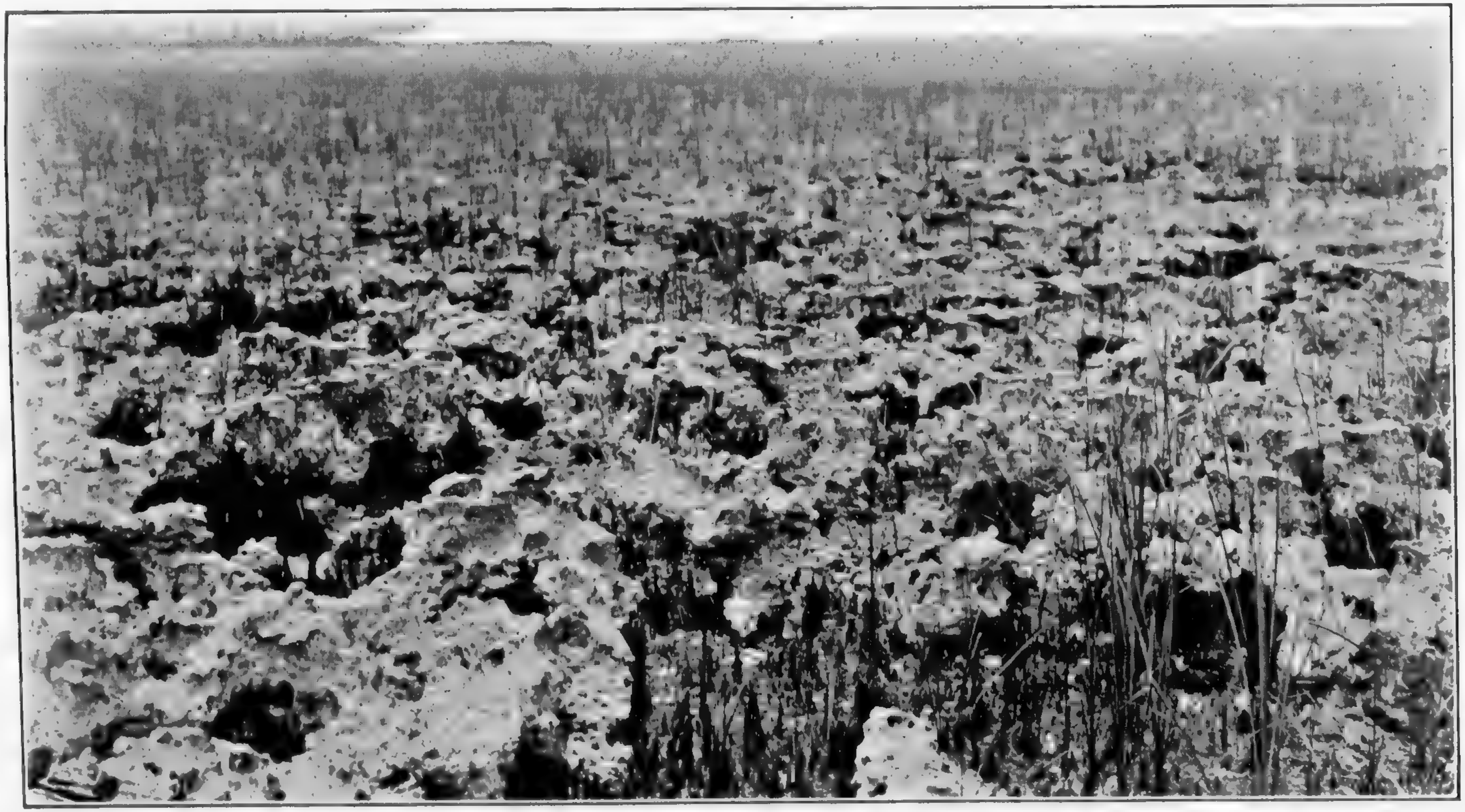
We drove from Miami to Daytona on or near the border line between two different plant regions, the "east coast strip" and the "south Florida flat-woods." The former region comprises the line of narrow more or less active sand-dunes along the eastern coast of the state, the lagoons, and perhaps some of the adjacent

mainland. Our route lay on the western side of the lagoons, the larger ones of which are Bay Biscayne, Saint Lucie Sound, Indian River, Halifax River, Banana River, and Mosquito Lagoon.

The waters of the lagoons are salt, brackish, or nearly fresh, depending upon the feeders, the inlets from the ocean, and the tide. Their plant life is usually not conspicuous, but it is often abundant. The principal plants are submerged, ditch-grass (*Ruppia*), horned pondweed (*Zannichellia*), naiad (*Naias*), partly emersed pondweed (*Potamogeton*), and arrowhead (*Sagittaria*). The most conspicuous plant is the cat-tail (*Typha*), which often grows luxuriantly and tall.

The active dunes, which result from the wind-shifted sands of the barrier beaches, extend as a comparatively narrow strip along most of the eastern coast. They are partly clothed with hammock, both open and dense, the growth ranging from knee-high in exposed wind-swept places to tall forest trees in more sheltered places. Besides the hard-wood trees and shrubs, practically all of which are evergreen, there is often a copious growth of palms, particularly the cabbage tree (*Sabal Palmetto*), saw palmetto (*Serenoa serrulata*), and at the southern end of the dunes the silver palm (*Coccothrinax argentea*). Two cycads, the so-called coontie or comptie, occur on the dunes. On those of the northern portion we find *Zamia pumila*, while at the southern end is *Zamia floridana*. Of course there is, as well, an extensive herbaceous flora.

On the western side of the lagoons we find principally pine-woods, "scrub," and hammock. These three plant formations abut, for varying distances, directly on the water, except near the southern part of the region, where in some places there are extensive marshes between the higher land and the lagoons proper. In the southern portion, too, the land is quite low and we find tropical shrubs and trees in abundance. At the extreme southern end on the mainland, as well as on the dunes, we have extensive growth of the red mangrove. On the higher land, for example the Brickell Hammock at Miami and the Deering Hammock at Cutler, we have an almost pure growth of typically



A "reef" in the Everglades southwest of Royal Palm Hammock. Such "reefs" represent the sites of former hammocks which have been destroyed as a result of prairie fires, which arise either naturally or through vandalism. In that region one may see hammocks in all grades of devastation. The ragged condition of the limestone is the result, apparently, of the leaching of the softer parts of the rock by water charged with the acids of decomposing vegetable matter percolating through it. A few young stalks of saw-grass (*Mariscus jamaicensis*), the dominant plant of the Everglades, may be seen in the foreground.

tropical shrubs, trees, and herbs. More conspicuous among these are the red mangrove (*Rhizophora*), the white mangrove (*Laguncularia*), the black mangrove (*Avicennia*), and the dune-mallow (*Malache scabra*). Further north for long distances, the marshes disappear and the stationary sand-dunes, with various kinds of hammocks or pinelands, form the water-front. Most of these old dunes are clothed with a copious growth of the sand pine (*Pinus clausa*), and an association of scrub oaks (*Quercus*) and rosemary (*Ceratiola*).

This "scrub," or formation of stationary sand-dunes, turns away from the present coast line south of the source of the Saint John's River and extends up between the Kissimmee and Saint John's Rivers to the region west of Lake George, thus forming a kind of a divide.

At several places where the dunes rise abruptly from Saint Lucie Sound and the Indian River, we find very interesting hammocks, quite different from any others in the state. There we find a mixture of typically tropical shrubs and trees, apparently altogether out of place, and shrubs and trees characteristic of more northern regions. The tropical elements were brought northward long ago in some way and maintained there, evidently, by the proximity of the continuously warm water of the lagoons.

Among the tropical elements may be mentioned: strangling-fig (*Ficus*), pigeon plum (*Coccolobis*), caper tree (*Capparis*), wild lime (*Zanthoxylum*), gumbo-limbo (*Elaphrium*), butter-bough (*Exothea*), bitterwood (*Simarouba glauca*), torchwood (*Amyris elemifera*), lancewood (*Ocotea*), myrsine (*Rapanea*), marlberry (*Icacorea*), satinleaf (*Chrysophyllum*), fiddlewood (*Citharexylum*), and white wood (*Schoepfia*).

Among the northern elements are hickory (*Hicoria*), mock orange (*Laurocerasus*), and wild olive (*Osmanthus*).

This mixture is often striking, particularly when we find the hickory growing with mastic (*Mastichodendron*). Tropical cacti grew there also, the genera *Harrisia* and *Selenicereus* being represented by a species each.

Further north along the Indian River many hammocks that invited inspection were passed by for lack of time. North of

Titusville the hammocks change perceptably and the live-oak and magnolia are the conspicuous trees. There, too, we found large shell-mounds, doubtless built by the aborigines, bordering the lagoons instead of sand-dunes.

Considering our course geologically, from Miami to Delray we had passed over the Miami oölite or the oölite covered with sand. From Delray to the estuary of the Saint Lucie River we traversed the Palm Beach limestone, mainly covered with sand; while thence to Daytona we traveled over the Pleistocene and recent geological formations.

After dark we entered historical country. As it happened our experiences in that region fell almost on the one hundredth anniversary of those of William Baldwin,[1] who describes his travels in a series of letters to William Darlington[2] in 1817. Speaking of New Smyrna, which town we passed through after sundown, he records a meeting with an ancient Minorcan, "one of those, who, more than half a century ago, were enticed from their native land, by the famous Dr. Turnbull,[3]—and experienced

[1] William Baldwin (1779–1819), a medical graduate of the University of Pennsylvania and a surgeon in the United States navy, was an enthusiastic student of the flora of the southern states. In 1805–06 he visited China, and in 1817–18, South America, but more than half of the last decade of his short life was spent in Georgia and neighboring states.—JOHN HENDLEY BARNHART.

[2] William Darlington (1782–1863) was a famous citizen of West Chester, Pennsylvania; physician, bank president, member of Congress, and enthusiastic student of the flora of Chester County. It is to him that we owe the preservation, in book form, of the literary relics of John Bartram, of Humphry Marshall, and of Baldwin. —JOHN HENDLEY BARNHART.

[3] Dr. Andrew Turnbull, a Scotchman of considerable means, was the local manager, and one of the promoters, of the first land improvement scheme in Florida. He brought about 1500 settlers from the shores and islands of the Mediterranean to a tract of land granted by the British government; some were from Smyrna, and the settlement was named New Smyrna; others were from Minorca, and the name "Minorcans" was applied to all of them by their neighbors. Many miles of roads were constructed in the wilderness, and the cultivation of indigo and sugar-cane undertaken on a large scale. This was in 1767. It is said that more than $150,000 was spent in this venture. The colonists were brought over under indentures which practically made them slaves for a term of years, and they claimed that they were cruelly treated by their overseers in Turnbull's absence; their indentures were finally canceled by the courts, the settlement at New Smyrna was abandoned in 1776, and the remaining 600 "Minorcans" were allotted home-sites at St. Augustine, north of the fort. Turnbull went to Charleston, and adhered to the cause of the colonies during the Revolution; in consequence of this, his New Smyrna grant was onfiscated.—JOHN HENDLEY BARNHART.

nine years of slavery at New Smyrna." In a later letter regarding the old settlement Baldwin says: "The fertility of the soil, the beauty of the situation, and the extent of former improvements, far exceeded my expectation. The houses were all neatly built with those fine materials peculiar to the country; but naked walls and chimneys alone remain to mark the spot where New Smyrna stood. So luxuriant has been the vegetation, that it was difficult getting along, without cutting our way. Where the car of Turnbull once drove in triumph, we find cabbage trees fifteen feet in height."

On the morning of the second day we left Daytona and started for the middle of the peninsula, taking a southwesterly course towards De Land. We were soon on an entirely different geological formation, the Pliocene deposits. Most of the country was covered with a growth of pine trees, not by one species, however, but by at least three. In the flat woods the yellow pine (*Pinus palustris*) occurred, while on the sand-hills the sand pine (*Pinus clausa*) grew abundantly. In the lower and wet regions the black pine (*Pinus serotina*) was the conifer represented. The pools in many places were yellow with the flowers of several bladderworts, both small and large. In low hammocks rose bushes with stems and branches more than fifteen feet long clambered up into the shrubs and trees. There, too, the loblolly-bay (*Gordonia Lasianthus*), a relative of the tea plant, was conspicuous by its large white flowers. The wet banks were carpeted with violets (*Viola*), white and blue, and with the partridge-berry (*Mitchella repens*).

In and about many towns Drummond's phlox (*Phlox Drummondii*) had taken possession of the roadsides and waste places, particularly about De Land, where we passed into the lake region. It was just west of this town that we came to the Saint John's River.

Here the river swamp was a veritable flower garden, both as regards aquatics and terrestrials. The pools in the swamp were filled with a water milfoil (*Myriophyllum proserpinacoides*), an aquatic naturalized from Chile. The ground was carpeted, often densely so, with a beautiful, fragrant, depressed labiate

(*Micromeria Brownii*) with numerous pale lavender flowers. The trees were hung with vines of the trumpet creeper bearing numerous festoons of the bright-red trumpet-shaped flowers as well as clusters of the long persistent cigar-shaped pods.

A short distance beyond the Saint John's River we left the Pliocene behind and passed on to the Oligocene deposits, which comprise a rolling country mostly forested with the yellow pine (*Pinus palustris*) and with a scattering of scrubby hammock in the lower parts.

We went as far as Lake Eustis, on whose shores the spiderwort (*Tradescantia reflexa*) was growing in banked clumps. A showy-flowered and exceedingly conspicuous ruellia (*Ruellia parviflora*) was also there in abundance.

In the scrubby hammock were colonies of prickly pears (*Opuntia austrina*), this locality being the northernmost limit of the range of this species—a range which extends as far south as Cape Sable. Growing with it was the scrub palmetto (*Sabal Etonia*), a close relative of the cabbage tree, but with a short curved stem that never rises above the surface of the ground and bears edible fruits several times the size of those of the cabbage-tree, with a flavor resembling that of the date.

We had hoped to be able to get into the Lake George region from Eustis, but lack of time and proper roads and trails denied us this portion of the excursion.[1] After returning to Daytona over nearly the same route by which we had come, we went to the active dunes to collect living specimens of prickly pears (*Opuntia*) and the so-called coontie (*Zamia*). We found fine specimens of both of these, and they are now growing at Buena Vista, thus offering an opportunity for comparison with related species native in southern Florida. In addition to the above-mentioned plants and others of more or less interest, we found the Indian sweet clover (*Melilotus indica*) and a commonly cultivated blanket-flower (*Gaillardia*) extensively naturalized in the hammock.

On the way from Daytona to Miami we made collections of

[1] A special excursion to that region was made in December, 1918. It will be described in a subsequent number of this Journal.

On the sand dunes south of Palm Beach, Florida. Rock is of very rare occurrence on the dunes in southern Florida. The rock here illustrated is of the Palm Beach limestone and it is situated near the crest of a wide dune, but only a short distance from the ocean. In the background is a dense hammock of stunted tropical shrubs and trees. On the face of the rock and over the opening of a cavern are numerous aërial roots of a young strangling-fig (*Ficus aurea*).

plants at several localities along the highway. The shell-mounds between Daytona and New Smyrna were carpeted, in many places, with a very copious growth of the sweet clover referred to above. Another Old World plant, common in the North, but rare in the South, was the great mullein (*Verbascum Thapsus*).

The most conspicuous plant along the inland marshes was a wild verbena (*Verbena tampensis*) known only from middle peninsular Florida, with showy heads of very large bright bluish-purple corollas. Often associated with it was the leaf-cup (*Polymnia Uvedalia*), which is less frequently seen in Florida than in the more northern States.

In the swamps the great magnolia was beginning to bloom and the low places and ditches were decorated with a generous growth of the obedient-plant (*Dracocephalum denticulatum*) and a milkweed of the coastal plain (*Asclepias perennis*).

Further south, in the vicinity of the older settlements, particularly between Titusville and Fort Pierce, several exotics commonly cultivated were found perfectly naturalized. They had doubtless been growing naturally for many years in that region, wholly neglected by botanists.

In one hammock near Cocoa, for example, we found not less than nine naturalized exotics, more than half of which had not previously been recorded for the flora of Florida, or even for the flora of the United States. They are: a Brazilian pea tree (*Sesban punicea*), Cape leadwort (*Plumbago capensis*), a South American vervain (*Verbena chamaedraefolia*), a South American lantana (*Lantana Sellowiana*), white petunia (*Petunia axillaris*), Cape honeysuckle (*Tecomaria capensis*), two acanthus-relatives (*Thunbergia fragrans* and *T. alata*), and an Indian gourd (*Coccinia cordifolia*).

A thorough search would doubtless bring more introduced species to light. For about these old settlements where garden plants have been cultivated in the perpetual warmth resulting from the adjacent lagoons, many plants are bound, in one way or another, to get beyond the gardens, and those finding congenial surroundings continue to grow and spread without further attention.

Further southward we found a large-flowered and very showy mallow (*Hibiscus furcellatus*) growing abundantly on the shores of a high sand-dune near Eden. This plant was formerly thought also to be an introduced exotic, but there now seems to be little or no doubt that it is a native. On the same dune we discovered two tropical vines, the balsam-apple (*Momordica balsamea*) and a poke-relative (*Adgestis clematidea*). Both plants were very abundant and bore masses of both flowers and fruits.

Throughout this excursion we noticed remarkably little animal life, except birds and lizards, and cast-off skins of snakes (no live serpents). The lizards were exceedingly plentiful. They are locally known as chameleons on account of their form and their faculty of changing color. Baldwin, as well as Bartram,[1] had better success in observing animals, perhaps their mode of travel (not by automobile) was less exciting to the denizens of the forests and the prairies, all of which brings to mind several paragraphs in two of Baldwin's letters in which he wrote:

"One beautiful little Lacerta bullaris has made its appearance since I began to write. Like the Chamelion, this innocent little creature has the faculty of changing color. Could I only see a huge 'magnanimous' (Bartram) rattlesnake, it would help out my story very much. During 5 years that I have been in this southern country, I have seen but one living rattlesnake! But, had not Bartram been here before me, I would astonish you with my account of the Alligators.[2] I should like to wind up this interesting botanical letter with some notice of Insects—could I call them by names less vulgar than sand-flies, horse-flies, etc. which have been buzzing about me since I began to write."

Several weeks later he wrote:

"I had the pleasing horrible prospect of a living rattlesnake, six feet in length. He had the generosity, when unperceived by us, to give the dread alarm; but a sudden leap, I apprehend,

[1] William Bartram (1739–1823) was associated from childhood with the scientific work of his father, John Bartram (1699–1777), the first native American botanist. He accompanied his father to Florida in 1765, insisted upon remaining there, and settled as a planter on the St. John's River, where he stayed about two years. In 1772 he began the extensive journey in the Carolinas, Georgia, and Florida, reported in his published "Travels." He was a botanical artist of much enthusiasm and considerable ability.—JOHN HENDLEY BARNHART.

[2] Bartram is sometimes accused of drawing the long bow in regard to alligators.

alone saved my companion from feeling the full force of his magnanimity. Never have I seen any thing so awfully, so horribly terrific, as this rattlesnake in anger. Even the gigantic alligator, with his iron sides, and formidable tusks, ever grinning horribly, with ghastly smiles, bears in my estimation no comparison. The fangs of this reptile were double, and an inch and an half in length.—Nothing but the difficulty of procuring proper accommodations for conveying him to Georgia, prevented me from saving his life, and taking him on with me to introduce to you, when I returned north."

A cursory examination was made of the coastal sand-dunes between Delray and Palm Beach. Delray is situated about the southern extremity of the Palm Beach limestone. This limestone, however, has had little or no effect upon the vegetation, as it is mostly buried deep beneath the coastal sands.

The dune hammock here is interesting and often picturesque. The shrubs and trees are, for the most part, similar to the ones that once clothed the dunes near Miami, but here they grow thickly over vast areas, and they show a greater variety in the shades of green. The forest covering the part of the dunes sloping toward the ocean, however, is very stunted. For long distances the trees are only about as high as one's head. The crowns, moreover, are flattened on top by the continuous action of the wind from the ocean, and instead of reaching skyward, all the woody vegetation is pushed over, as if leaning away from the water or from the prevailing wind. Whole forests thus look as if a mighty hand had brushed across them and pressed them down.

On the leeward side of the dunes the arboreous vegetation is more normally developed. Where the dunes were tall, the trees were large and the forest extensive. There also the cabbage tree (*Sabal Palmetto*) was a prominent feature of the vegetation.

Although the Palm Beach limestone is normally buried beneath the sand of the dunes, there is an outcrop on the leeward side of a dune about midway between Delray and Palm Beach. Some of the deeply buried parts of the rock were long ago leached out and a portion of the upper part then caved in, thus forming some shallow caverns. A strangling-fig (*Ficus aurea*) growing on the face of one of these caves has sent down roots which now partly obstruct the mouth of the cavern. (See accompanying plate.)

In the open places there was a remarkable growth of the gopher-apple (*Geobalanus oblongifolius*) with the plants in full flower. This is one of the species—of which there are many in the southeastern United States—that, as a matter of protection, have come to bury their main stems under the ground, and it is from these buried stems that they send up their branches erect. This condition most likely came about as a result of the fires that continuously sweep the country in which it grows. For, although it is a woody plant, its exposed wood is not resistant to fire. Thus, when fire-swept, all the branches are burned off, but new ones arise subsequently from the buried stem. The gopher-apple has no relative outside of the southern coastal plain. Another interesting case of a shrub with the main stem buried is found in northern peninsular Florida and northward. It is the chinquapin of the coastal plain, both that of the Atlantic and that of the Gulf. The widely distributed common chinquapin (*Castanea pumila*) grows mainly in the Piedmont and mountainous regions, where fires are comparatively rare, owing to a more fertile soil and a limited amount of tinder. Consequently, we find a larger plant—a tall tree or shrub. In the dry pinelands of the coastal plain, on the other hand, we find a poor soil and plenty of tinder. There, ordinarily, shrubs do not grow large and while still young they are very likely to be destroyed by a forest fire. Therefore, the chinquapin of the coastal plain is naturally a low shrub, but really not a small shrub, for it is greatly elongated. Upon investigation one will find that he can pull up a stout underground woody stem of the chinquapin several rods long. Beneath the sand this organ is perfectly safe from fire, and again as soon as fire has burned the erect branches, leaving mere blackened stubs, this buried stem sends up new branches to take their places.

Neither do the older geological formations, however, lack shrubs with subterranean stems. While writing this paper our attention was directed to an article bearing on this subject,[1] concerning the box huckleberry (*Gaylussacia brachycera*), chiefly as it occurs in the Blue Ridge of Pennsylvania. The particular

[1] Frederick V. Coville, Science, N. S. **50**: 30–34. 1919.

plant in question and the only individual known to exist in a wild state, except another single plant in Delaware, is a shrub with underground stems occupying about eight acres and estimated to be over one thousand years old. A study of the shrubs with subterranean stems in the southern coastal plain and adjacent regions holds fascinating possibilities.

The most conspicuous herb of the open places in the hammock was a wild vervain (*Verbena maritima*) which was first collected at Cape Florida nearly a century ago. It was in full flower, and the numerous flower-clusters often eclipsed all other associated vegetation and sometimes formed extensive fields of blue. Although the conditions were apparently quite favorable, the more interesting and rare plants of the Miami dunes which lie only sixty-odd miles south of Palm Beach were not in evidence.

The last local excursion was made to the crest of the southern extremity of the water-shed of the Saint John's River. The term is here used technically, as no elevation is perceptible to the eye. This locality lies about one hundred and fifty miles north of Miami and a few miles inland. The region is uninhabited except for an apparently wholly out-of-place settlement called Felsmere, which in itself is rather embryonic. This watershed is indicated not only by the Saint John's, flowing northward on its long journey to the sea, but by the Onothohatchee and other small streams flowing southward into Lake Okeechobee; also by two local short rivers—the Sebastian flowing north for a dozen miles or so into the Atlantic and the Saint Lucie flowing south from near the source of the Sebastian, and also emptying into the Atlantic. However, the country is so flat that the water seems loath to flow at all.

Going westward from the vicinity of the settlement of Sebastian, after crossing the coastal range of stationary dunes, one comes out into the East Florida flatwoods, which geographical division, including various subdivisions, extends from Jacksonville southward. Beyond the Sebastian River streams are scarce or altogether wanting. There are both wet and dry pinelands, and the water apparently drains away north and south into lakes or lakelets which in turn give rise to streams which often connect and drain chains of lakes.

Several miles west of the Sebastian River we entered about as prolific a natural flower garden as I have seen in Florida, for here the pine-woods were a mass of flowering plants.

The low or wet places were carpeted with creeping plants of the figwort family (*Ilysanthes grandiflora* and *Hydrotrida caroliniana*); creeping evening primroses (*Ludwigia* and *Isnardia*), and white and blue violets, all interspersed with our smallest lobelia (*Lobelia Feayi*), but one with corollas equalling those of *Lobelia Kalmii* and related species in our northern regions.

In higher and drier places plants with yellow flowers often predominate. Thus there were three kinds of milkworts (*Polygala ramosa*, *P. lutea*, *P. cymosa*); Saint John's-worts (*Hypericum opacum*, *H. fasciculatum*); Saint Peter's-worts (*Ascyrum stans*, *A. tetrapetalum*); yellow asters (*Chrysopsis graminifolia*, *C. gigantea*); tickseed (*Coreopsis Leavenworthii*); beggar-ticks (*Bidens coronata*); heliotrope (*Heliotropium Leavenworthii*); sneezeweed (*Helenium tenuifolium*); helianthella (*Helianthella angustifolia*).

The sole, or at least the only conspicuous monocotyledon represented, aside from numerous grasses and sedges, was the pine-stars (*Oxytria albiflora*), a bulbous plant of the lily family which grew in clumps nearly everywhere.

Other white-flowered plants were: milkworts (*Polygala Baldwinii*), grass pinks (*Sabbatia Elliottii*), and beard-tongue (*Pentstemon multiflorus*).

Green also was prominent among the flowers, and it was especially represented by the milkweed family: green milkweed (*Acerates floridana*) and three related plants which are without "common" names, *Podostigma pedicellata*, *Ananthirax connivens*, *Asclepiadora viridis*.

Other and at the same time often brilliant colors were furnished by different kinds of meadow-beauties (*Rhexia cubensis*, *R. stricta*, *R. glabella*), bush clover (*Petalostemon carnium*), milkweed (*Asclepias lanceolata*), and the grass pink (*Sabbatia grandiflora*).

Altogether the land is not very much elevated, as is evidenced by the large number of moisture-loving plants that occur along with those typical of drier soil.

On our return trip we stopped to collect at the crossing of the Sebastian River. This stream has not figured in botanical records heretofore, and it thus seemed worthy of more investigation than we were able to devote to it. A tangled hammock lines the water's edge and extends back into the pinelands varying distances according to the character of the banks. We had little time to penetrate this jungle, but a short incursion brought to light the guava (*Psidium Guajava*), widely naturalized in this out of the way place, growing from seeds probably sown by birds.

The really interesting discovery, however, was a tree lead-plant (*Amorpha*), the first arboreous kind for the genus. The common shrubby lead-plant of the coastal region was just coming into flower, but this new one was past flowering, and bore only immature fruits. We hope to secure specimens in both flower and fruit later on.

Collecting along the Sebastian River incidentally brought to mind the condition of our knowledge, or rather lack of knowledge, of the floras of the numerous short and long rivers of Florida. The hammocks, prairies, swamps, and marshes of these various streams doubtless contain plants we know nothing about, and each river and its environs most likely harbor plants peculiar to themselves. Thus, each successive excursion into the wilds of the Peninsular State suggests fresh problems only to be solved by further field study and exploration.

Respectfully submitted,

JOHN K. SMALL.

NOTES, NEWS AND COMMENT

The Garden was visited August 27 by some four hundred members and guests of the American Pharmaceutical Association, then in convention in New York. The party, divided into groups, was guided through the Museum Building by members of the Garden staff, after which they visited the main conservatory range and drove through the grounds. The time was too brief for more than a cursory view of the collections, especially those

in the economic section, and many regrets were expressed that the fine materia medica collections could not be examined in detail, these being naturally of paramount interest to pharmacists.

Dr. and Mrs. N. L. Britton spent a two weeks' vacation in September at Mohonk Lake, New York.

Dr. J. N. Rose, of the Smithsonian Institution, spent two weeks at the Garden during September, studying the collections of cacti which he and Dr. Britton are monographing for the Carnegie Institution.

The exhibit of dahlias, held at the Garden September 20 and 21, was unusually successful. The Garden collection was in full bloom and, supplemented by the displays of outside dahlia growers, attracted a large number of visitors.

The glass-houses of Range 2, which had been vacated because of coal shortage over a year ago, have been partially reoccupied. The transverse house is now devoted to cycads and the larger ferns, while the three longitudinal houses are given to temperate zone woody plants, the smaller ferns, and orchids.

Dr. W. A. Murrill was invited to represent the New York Botanical Garden at a meeting of plant pathologists and Connecticut farm bureau agents, held during the week beginning August 18 at New Haven, Storrs, and elsewhere, for the discussion of some of the most important problems now confronting the Connecticut farmers, fruit growers, and truck gardeners. About twenty botanists, mostly from New England and New York, were present; while several hundred other persons were in attendance at special meetings. The evenings were devoted to brief papers and discussions; the mornings and afternoons to automobile tours through the plantations between New Haven, Hartford, and Storrs, covering a distance of three hundred miles.

The following visiting botanists have recently enrolled in the

library: Mr. Harry G. Wolfgang, Leetonia, Ohio, Rev. A. B. Hervey, Bath, Me., Mr. W. C. Fishlock, Tortola, B. W. I., Mrs. Adele Lewis Grant, Missouri Botanical Garden, Professor E. T. Bartholomew, Madison, Wis., and Dr. J. N. Rose, Washington, D. C.

After repeated efforts to find the plant in flower and not submersed by the tide, on September 10 of this season Dr. F. W. Pennell was successful in obtaining *Hemianthus micranthus* with its corollas expanded. This diminutive member of the figwort family grows in the gravelly tidal flats of the Delaware River above Camden, New Jersey, and its remarkable flower-structure has not been described from fresh corollas since the days of its first discovery by Thomas Nuttall over one hundred years ago. *Hemianthus micranthus* is the only northern member of a considerable West Indian genus, the various species of which show interesting steps in an evolution from a flower similar to that of most of this family to such as our own, a species which truly deserves the name of *Hemianthus*, "half flower."

Meteorology for August.—The total precipitation for the month at the New York Botanical Garden was 4.13 inches. The maximum temperatures for each week were 92° on the 8th, 84½° on the 11th, *95° on the 24th*, and 84° on the 29th. The minimum temperatures were 55° on the 3d, *52° on the 9th*, 60° on the 19th, and 53° on the 28th.

ACCESSIONS

MUSEUMS AND HERBARIUM

500 specimens of European flowering plants. (By exchange with Oxford University.)

100 specimens of flowering plants from the United States and Canada. (Collected by John Macoun.)

1,000 specimens of flowering plants from Mexico. (Collected by Brother Arsène.)

3 specimens of mosses from Venezuela. (By exchange with the United States National Museum.)

1 specimen of *Selaginella apus* from New York. (Given by Dr. W. A. Murrill.)

12 specimens of fossil marine algae from France. (By exchange with Mr. Lucien Morellet.)

9 specimens of different species of *Ochroma*. (Given by Professor W. W. Rowlee.)

1 specimen of *Trillium undulatum* from North Carolina. (Given by Mr. A. M. Huger.)

16 specimens of marine algae from the Antarctic. (By exchange with Dr. Carl Skottsburg.)

127 specimens of flowering plants from California. (By exchange with the Field Museum of Natural History.)

180 specimens of flowering plants from California. (Collected by Miss Roxana S. Ferris.)

1 specimen of *Corticium vagum* from Alabama. (By exchange with Mr. George L. Peltier.)

28 specimens of fungi from Maryland. (By exchange with Mr. C. A. Schwarze.)

1 specimen of *Cordyceps* from Pennsylvania. (By exchange with Dr. L. O. Overholts.)

1 specimen of *Cenangium Abietis* from New Mexico. (By exchange with Mr. W. H. Long.)

3 specimens of fungi from Ontario. (By exchange with Prof. John Dearness.)

1 specimen of *Craterellus cornucopioides* from Maryland. (By exchange with Mr. C. A. Schwarze.)

5 specimens of fungi from Ontario. (By exchange with Professor John Dearness.)

1 specimen of *Lepiota cretacea* from Washington, D. C. (Collected by Dr. J. N. Rose.)

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SOME BLUEBERRIES OF MARLBORO, N. H.

Southern New Hampshire is noted for the great abundance and variety of its blueberries, so that I was glad of an opportunity, during the middle of July of the present year, to make collections there for the Economic Museum of the Garden. In doing so, I found the varieties and forms so numerous, and their relations so interesting, as to be worthy of published record.

Most of my studies and collections were made on the estate of Mrs. B. C. Knight, of Marlboro, and the adjoining one of Mr. Baker. The plants grew in rocky pasture land, mostly rather dry, but with some damp spots. Practically all of the forms described grew on the dry lands.

I found no specimen of *Gaylussacia*, nor any of the section *Euvaccinium*, nor was I able to learn that any of either group occurs in the region. My observations were confined therefore to the *corymbosum* and *pennsylvanicum* groups of the section *Cyanococcus*. All the forms here described are represented by specimens in the Garden Herbarium, designated by the numbers here employed preceded by the word "Marlboro." Most of these are also preserved in formaldehyde in the economic museum but do not there bear these numbers.

Had all definite, or even all striking forms been collected, the number would have been considerably larger, for there are conspicuous differences in habit of growth, as well as in herbarium characters, which cannot be overlooked and which are constant in numerous individuals. So numerous are the forms and so

gradual the series of variations, that it seems as though names can be regarded merely as conveniences for indicating certain of these grades. While questions of hybridity can be settled only experimentally, there seems to me to be no other way of accounting for conditions in this group than by assuming free hybridization.

The species represented in the collection are *Vaccinium corymbosum*, *atrococcum*, *angustifolium* (*pennsylvanicum*), *canadense*, and *vacillans*. The last two are not common and did not present any particular diversity, although it is not impossible that cross pollination of *corymbosum* and *canadense* is responsible for some of the variations observed. *Vaccinium nigrum* Britton may be a distinct species from the var. *nigrum* here discussed, which latter appears to me to be a variety of *V. pennsylvanicum*.

It is worthy of note that all the forms discussed grow together indiscriminately. There is no particular habitat that is especially favorable to any of them. All grow taller in shaded locations or when massed or amidst other shrubbery, and more low and spreading when in open sunny positions. I have been surprised to find a plant a foot taller than myself that certainly appears to belong to *V. pennsylvanicum*, unless it be a hybrid of that with *V. corymbosum*, which is not at all improbable.

V. CORYMBOSUM L. The typical plant is tall, forming large clumps, with spreading branches and leaves, the latter more or less broad, the margin entire, the entire plant glabrous, the berry large and blue. Although the species, in other forms, is the predominant one of the locality, this typical form was not found. The nearest approach to it was an occasional plant differing only in slight hairiness on the veins of the lower leaf surface.

Number 1 of my collection represents the form just mentioned, except that the leaf margin is sharply serrate with bristle-pointed teeth. The leaves are quite pale beneath, but are not glaucous.

Number 2 differs from Number 1 in having the lower leaf surface very pubescent and the twigs slightly so. The hairs are

rather long, straight and stout, and strongly spreading. The upper surface of the leaf is glabrous but not shining. The berries are either bright-blue or nearly black, but never in the least shiny.

Number 3 differs from the two preceding in having the leaf margin entire or obscurely denticulate, and ciliate with fine soft hairs. The lower surface is only slightly pubescent on the veins. This is rather scarce and is perhaps the nearest approach to the typical form.

Numbers 4 and 5 represent the var. *amoenum* of Gray's Manual, the leaves being of a bright-green color on both surfaces. Number 5 has both surfaces glabrous and the margins sharply serrate with bristle-pointed teeth. In number 4, there is a slight pubescence on the lower surface and the margin is practically entire. This variety *amoenum* is probably the predominant high bush blueberry of the region, although the plants are often only two or three feet high and widely spreading. Its berries are very large and fine, of a bright-blue color, and it is the favorite form of fruit-gatherers.

Number 6 agrees with the scanty description of var. *pallidum* found in Gray's Manual. It is a very distinct form and is quite abundant. The shrub is very tall and rather strict and contracted. The branchlets and leaves incline to an erect position, the latter being thick, rigid, elongated, and large, tapering to both ends, the margin quite entire, both surfaces smooth and the lower glaucous. The berries incline to an elongated form, with large calyx lobes, and are very glaucous. Quite often they are smaller and dryer than in the other high bush forms.

Number 7 differs from Number 6 in having a few stiff hairs on the veins beneath and the margin bristly serrate. The lower surface is quite glaucous, although this does not show very well in the dried specimen.

V. ATROCOCCUM (Gray) Heller. This, although very variable, is a well-marked species. It seems to me to hybridize with others but even in the hybrids its own character is always strongly apparent. The shrub may be quite as tall as any form of *V.*

corymbosum, but is always more spreading, as are also its leaves. The fruit clusters are shorter and more open than in *V. corymbosum*. Its berries are large, black and almost always shining, and luscious. The occasional dull-berried forms may be hybrids. The hairs are not straight as in all the others of the region, but are inclined to be fine, soft, and more or less curly or at least crooked. This pubescence is well denominated as "down."

Number 8 has the leaves hairy beneath, the margins entire, but softly hairy. Number 8 A has the leaves markedly pale beneath and appearing as though glaucous, although somewhat hairy, with the margins entire and softly hairy. The berry is dull-black. Number 8 B is low and slender. The leaves are small, narrow and thin, as in var. *nigrum*, hairy on the midrib beneath, with the margin entire. The branches of the inflorescence, calyx, etc., are bright-red. Number 8 C is similar, but very tall. Its twigs, petioles, and lower leaf surface are very hairy, and its leaves are markedly shiny on the upper surface.

Number 9 is *V. atrococcum*, but with the leaves hairy on both surfaces and the margin entire. Number 10 is *V. atrococcum*, but with the leaf margin bristly-serrate. Number 11 is similar, but with the leaves very hairy beneath, shining above, and with bristly-serrate margin.

V. ANGUSTIFOLIUM Ait. (*V. pennsylvanicum* Lam.). Both the typical plant and its numerous varieties are very common and abundant. The type has its twigs green and finely warty but glabrous, the leaves thickish and firm, lanceolate to oblong, acute at the summit and less so at the base, smooth and shining on both surfaces, the margin sharply serrate with bristle-pointed teeth, the berry large, blue, and sweet. The shrub is usually low and spreading, but presents many distinct forms as to habit. Of each of the forms described below there is a black-berried variety.

Number 12 is the typical plant just described. Number 13 differs in having the young twigs, petioles, and lower leaf surfaces hairy, the hairs being straight and spreading. Number 14 differs from the latter only in having the leaf margin entire. This may be a form of or a hybrid with *V. canadense*.

Number 15 has the twigs, petioles, and lower leaf surfaces copiously hairy, the leaves broad, pale, and thin, with the margin as in the type.

Number 16 is *V. pennsylvanicum angustifolium* of Gray's Manual. It is a strikingly distinct form and fully deserves a name, but if the species is to be called *angustifolium*, the varietal name must of course be different. This plant is conspicuous by the very erect habit of its branches and leaves, the extremely tough nature of its stems, and its narrow leaves of a very deep green, with the midrib hairy on the lower surface. It strongly suggests specific rank.

Number 17 has the leaves broader than those of number 16, but narrower than in regular *V. pennsylvanicum*, with the margin merely denticulate. It preserves the same habit.

V. ANGUSTIFOLIUM NIGRUM Wood. The question of the existence of *V. nigrum* as a distinct species, as claimed by Britton, is not here raised, but I am not in doubt as to the black-berried forms described below being mere varieties of *V. angustifolium*. Every form of this species as described above, with the exception of number 16, occurs with both blue and black berries. These may be either dull or shiny, but are never so markedly shiny as in *V. atrococcum*.

Number 18 is the typical form described as number 12, except for the black berries. Its twigs are green and warty as in the type. Number 19 differs from the preceding only in having the midribs hairy on the lower surface, while number 20 has neither leaf surface shiny and the lower surface is hairy.

There are two other forms of var. *nigrum* of which I appear to have missed collecting specimens. One is similar to Number 20, except that the leaf margin is entire and softly hairy. It is noted that this approaches very closely to *V. canadense*, differing only in having the upper leaf surface dull and glabrous instead of dull and hairy, and in having black berries. There seems to be no good evidence in the fruiting specimen to show that it should not be regarded as a black-berried form of *V. canadense*. The other is a form that appears intermediate between var. *nigrum* and *V. atrococcum*. It is much taller than *V. pennsyl-*

vanicum, but has its habit rather than that of *V. atrococcum*. The berries are shiny and the branches of the inflorescence red, as sometimes occurs in that species, and what pubescence there is, is more like that of the latter.

H. H. RUSBY.

THE HISTORY OF THE LONDON PLANE

For many years the London plane, *Platanus acerifolia*, has been a favorite shade tree for city streets in the eastern United States, because of its extraordinary ability to flourish under conditions of drought and smoke which prove fatal to other species. In New York City at present, a majority of the trees in the more congested districts are of this form. It is, however, usually planted under the name of Oriental plane, *Platanus orientalis*, and has been mistaken for that species not only by nurserymen but by some botanists as well.

A recent article in the *Proceedings of the Royal Irish Academy*, entitled "The history of the London Plane," by A. Henry and Margaret G. Flood, throws much light on the nature and origin of this interesting tree, and indicates that it is a hybrid of the Oriental plane and the native buttonwood or sycamore, *Platanus occidentalis*. Since this article will be easily overlooked by American planters and since the tree is of so much importance in American gardening, it seems advisable to give some extracts from the original article.—ED.

"The London Plane, *Platanus acerifolia* W., has all the peculiarities which are met with in a first cross. It is intermediate in fruit and leaves between the supposed parents—the Oriental Plane, which is indigenous in Greece and Asia Minor, and the Occidental Plane, which grows in a wild state in the forests of the eastern half of the United States. Its vigor is exceptionally great, as is usual in hybrids of the first generation; and its seeds when sown produce a mixed and varied crop of seedlings, in which are variously combined the characters of the two parents. Several supposed forms of the London Plane which are not un-

commonly cultivated, appear to be chance seedlings of this tree, being hybrids of the second generation.

"The vigor of the London Plane is remarkable. It is extensively used for planting in the streets of towns in Europe and North America, as it has been found to surpass all other trees in its powers of resistance to drought, smoke, and other unfavorable conditions of soil and atmosphere. In the cities of New England, Ohio, Pennsylvania, etc., the London Plane is much more successful as a street tree than the Western Plane, notwithstanding the fact that the latter is the finest and largest native broad-leaved tree in the forests of these states. The selection as a street tree of the London Plane in preference to the native species in the regions where the latter flourishes, depends on the vigor inherent in the former tree on account of its hybrid origin.

"The London Plane, being undoubtedly a hybrid, must have originated as a chance seedling in some botanic garden, where an Occidental Plane and an Oriental Plane happened to be growing close together. Such a seedling, by the vigor of its growth and the novelty of its foliage, would attract attention and be propagated by an observant gardener. The ease with which the London Plane can be raised from cuttings would much facilitate its propagation. I shall try to show that it possibly originated in the Oxford Botanic Garden about 1670, though this surmise cannot be definitely proved.

"The Occidental Plane was introduced from America into England by Tradescant in 1636, about a century later than the earliest record of the Oriental Plane in this country. By 1670, there would have been trees of the American species old enough to bear pollen. The connexion with Oxford is as follows: Jacob Bobart, junior, who succeeded his father as curator of the Botanic Garden at Oxford in 1680, left in MS. an 'Enumeration of Trees and Shrubs,'* in which for the first time there is mention in any record of the London Plane. This MS. is unfortunately without date; but a similar MS. has 1666 on the flyleaf. In the 'Enumeration' the planes in cultivation are distinguished as follows:

* "This is printed by Vines and Druce, 'Account of Morrisonian Herbarium,' p. 261 (1914)."

"No. 475. Platanus orientalis, pilulis amplioribus.

"No. 476. P. inter orientalem et occidentalem media.

"No. 477. P. occidentalis aut virginiensis.

"Corresponding to the diagnosis, No. 476, of the London Plane, as intermediate between the Oriental and the Occidental species, there is a dried specimen, undoubtedly *P. acerifolia*, in the Sherard Herbarium at Oxford, labelled '*Platanus media*.'

"The first published description of the London Plane was by Plukenet in 1700, in his 'Mantissa,' p. 153, which reads as follows: 'Platanus orientalis et occidentalis mediam faciem obtinens, Americanus, globulis grandioribus, foliis splendentibus atris.' The type specimen of this description is in the British Museum, Herb. Sloane, No. 101, folio 112. In addition there are two sheets of speciemens, collected by Petiver about the same period. one of which, Herb. Sloane, No. 149, folio 237—two fine leaves of *Platanus acerifolia*—is labelled '*Platanus media*, n. d. Bobart, Ox.'

"It is possible that the original tree, from which this specimen was taken by Bobart, was then living in the Oxford Botanic Garden. As Plukenet describes this plane as bearing large fruit-balls in 1700, it may have been then thirty years old, which would give the date or origin of *Platanus acerifolia* as 1670.

"This history synchronizes well with the date of the magnificent London Plane,* probably the oldest in Europe, which is living in the Palace Garden at Ely and now measures 110 feet high, the trunk being 23 feet in girth at 5 feet above the ground. It was planted by Gunning, when he was bishop there between 1674 and 1684. Bishop Gunning spent some time at Oxford before his appointment to the Ely diocese.

"The splendid London Plane at the Ranelagh Club, Barnes, is precisely of the same size as the Ely tree, and is probably of the same age, both these trees being apparently cuttings of the original tree, which is postulated in this account to have been in the Oxford Botanic Garden. There is no record of the age of the Ranelagh Club tree. There are two other immense London

* "Owing to an unfortunate mistake, the Ely tree is erroneously identified with *P. orientalis* in Elwes and Henry, 'Trees of Great Britain,' iii, 621, plate 174 (1908)."

Planes, probably coeval with the Ely tree, namely, one at Peamore, near Exeter, and the other at Woolbeding, Sussex, but no particulars of their history can be obtained.

"On the Continent there are no examples of the London Plane approaching in size or age the fine trees at Ely and Barnes; and no mention is made of it by any Continental writer before 1703, when it was briefly described by Tournefort. Since the latter date, the cultivation of the London Plane has spread over the Continent, and it is now common in towns in France and Germany. In the United States, as stated above, it is widely cultivated as a street tree, but almost invariably under the erroneous name of '*P. orientalis*.' The true *P. orientalis* is very rare in America, and is never used for planting in streets.

"When the seed of a first cross is sown the seedlings produced constitute a mixed and varied crop, in which are variously combined the characters of the two parents. The best proof then of the hybrid nature of *P. acerifolia* is the fact that is does not come true from seed, which appears to have been known to Lorberg in 1875. Two sowings made in recent years establish this very clearly. There are now eight seedlings planted in the Queen's Cottage grounds at Kew which were raised from seed of *P. acerifolia* that was sown in April, 1911. These range in height from 4 to 10 feet, and are very diverse in foliage, some closely resembling *P. orientalis* and others resembling *P. occidentalis*, a few being intermediate. One of them appears to be identical with *P. hispanica*, and another with *P. cuneata*. There are also two seedlings at Glasnevin which are the only survivors of a set raised for me at Cambridge in 1910 from seed of a large London Plane growing near the main gate at Kew. The rest of the set died from drought, having been transplanted into a field in that dry year. These two seedlings are extremely unlike in foliage; one has leaves indistinctly lobed resembling those of *P. occidentalis*. The other has deeply lobed leaves, and differs little from *P. cuneata*.

"Several unsuccessful attempts have been made since 1910 to raise a numerous set of seedlings of the London Plane with the object of studying the botanical characters of the various

classes which are wont to occur in the second hybrid generation. Space for such experiments is scarcely available, as planes do not assume for several years their adult foliage, and do not produce fruit till they are twenty or thirty years old.

"The artificial production of a cross between *P. orientalis* and *P. occidentalis* has not been possible in this country, where there exists no adult living tree of the latter species from which pollen could be obtained. An attempt to reproduce *P. acerifolia* by cross-pollination of the Occidental and Oriental Planes might be made in the United States, using the native tree as the female parent."

THE SCIENTIFIC SURVEY OF PORTO RICO AND THE VIRGIN ISLANDS

In 1913, the New York Academy of Sciences in coöperation with the insular government of Porto Rico, The American Museum of Natural History, The New York Botanical Garden, and with scientific departments of Columbia University and other institutions, commenced an investigation of the geology and natural history of Porto Rico, which was subsequently extended to include the Virgin Islands. Field, museum and laboratory work have since been prosecuted by a large number of investigators and students of the several institutions, and although much interrupted and retarded by war conditions, the study is well advanced, and some 36 preliminary papers have been published in various journals and bulletins of institutions and in the proceedings of learned societies. The collections of the institutions have been enriched by many thousand specimens obtained during the field operations.

The first part of the first volume of the final reports of this Survey was published on September 26th, 1919, and may be purchased from the Secretary of the Academy. It is an octavo book of 110 pages, with 26 text-figures, 4 plates and 3 maps, and contains (1) A History of the Survey, with references to the already published preliminary papers, by Dr. N. L. Britton; (2) Geological Introduction, including a discussion of the major

geologic features and a bibliography by Professor C. P. Berkey, to which is appended a description of a new base map of Porto Rico by Dr. Chester A. Reeds; (3) Geology of the San Juan District, an area of about 500 square miles on the northern side of Porto Rico, by Dr. Douglas R. Semmes.

The final reports on the botany of the Survey will take the form of a descriptive and annotated flora, based largely on specimens in the herbarium and museum of the New York Botanical Garden obtained during several collecting expeditions by members of the staff and special agents from 1901 to 1916. Much manuscript for these reports has been prepared, and it is planned to publish the first botanical part in 1920.

The publication of these survey reports will go far toward making Porto Rico the key to the geology and natural history of the West Indies.

N. L. BRITTON.

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Oxydendrum. SOURWOOD

Oxydendrum arboreum. SOURWOOD.

Location: Fruticetum. East bank of West Lake.

Natural distribution: Southeastern United States.

Epigaea. TRAILING ARBUTUS

Epigaea repens. TRAILING ARBUTUS.

Location: Wild, very scarce, though formerly more common; exterminated by the public.

Natural distribution: Eastern North America.

Gaultheria. GAULTHERIA

Gaultheria procumbens. CREEPING WINTERGREEN.

Location: Wild, scarce.

Natural distribution: Eastern North America.

Calluna. HEATHER

Calluna vulgaris. HEATHER.

Location: Fruticetum.

Natural distribution: Europe.

VACCINIACEAE. Huckleberry Family

Gaylussacia. HUCKLEBERRY

Gaylussacia baccata. BLACK HUCKLEBERRY.

Location: Fruticetum.

Natural distribution: Eastern North America.

Polycodium. DEERBERRY

Polycodium stamineum. DEERBERRY.

Location: Fruticetum.

Natural distribution: Eastern United States.

Vaccinium. BLUEBERRY

Vaccinium angustifolium. LOW-BUSH BLUEBERRY.

Location: Fruticetum.

Natural distribution: Northeastern North America.

Vaccinium atrococcum. BLACK BLUEBERRY.

Location: Wild.

Natural distribution: Eastern United States.

Vaccinium corymbosum. HIGH-BUSH BLUEBERRY.

Location: Wild.

Natural distribution: Eastern North America.

Vaccinium pallidum. PALE BLUEBERRY.

Location: Fruticetum.

Natural distribution: Virginia to South Carolina.

Vaccinium vacillans. BLUE HUCKLEBERRY.

Location: Fruticetum.

Natural distribution: Eastern United States.

EBENACEAE. Ebony Family

Diospyros. PERSIMMON

Diospyros virginiana. PERSIMMON.

Location: Arboretum. Along road east of Museum. At fountain southeast of Museum.

Natural distribution: Southeastern United States.

SYMPLOCACEAE. Sweet-leaf Family

Symplocos. SYMPLOCOS

Symplocos paniculata. ASIATIC SYMPLOCOS.

Location: Arboretum.

Natural distribution: Himalayan Region to China and Japan.

STYRACACEAE. Storax Family

Halesia. HALESIA

Halesia carolina. SNOWDROP-TREE.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Styrax. STORAX

Styrax americana. SMOOTH STORAX.

Location: Fruticetum.

Natural distribution: Southeastern United States.

Styrax japonica. JAPANESE STORAX.

Location: Fruticetum.

Natural distribution: Japan.

Styrax Obassia. OBASSIA STORAX.

Location: Fruticetum.

Natural distribution: Japan.

Pterostyrax. WINGED STORAX

Pterostyrax hispida. HISPID WINGED STORAX.

Location: Fruticetum. Near approach to elevated rail-road.

Natural distribution: Japan.

OLEACEAE. Olive Family

Fontanesia. FONTANESIA

Fontanesia Fortunei. ENTIRE FONTANESIA.

Location: Fruticetum.

Natural distribution: Eastern China.

Fontanesia phylleraeoides. TOOTHED FONTANESIA.

Location: Fruticetum.

Natural distribution: Sicily, Asia Minor, Syria and Palestine.

Fraxinus. Ash

Fraxinus americana. White Ash.

Location: Arboretum. Both sides of road at Lake Bridge. Wild, common.

Natural distribution: Eastern North America.

Fraxinus americana var. **cucullata.** Hood-leaved White Ash.

Location: Arboretum.

Fraxinus biltmoreana. Biltmore Ash.

Location: Arboretum. Near Power House 1.

Natural distribution: Southeastern United States.

Fraxinus Bungeana. Bunge's Ash.

Location: Arboretum.

Natural distribution: China.

Fraxinus campestris. Prairie Ash.

Location: Arboretum. Near Power House 1.

Natural distribution: North Central United States.

Fraxinus excelsior. European Ash.

Location: Arboretum.

Natural distribution: Europe and western Asia.

Fraxinus excelsior var. **aurea.** Golden European Ash.

Location: Arboretum.

Fraxinus mandschurica. Manchurian Ash.

Location: Arboretum. Near Power House 1.

Natural distribution: Manchuria, Chosen and Japan.

Fraxinus Michauxii. Michaux's Ash.

Location: Arboretum. Wild, north meadow.

Natural distribution: Eastern United States.

Fraxinus nigra. Black Ash.

Location: Arboretum.

Natural distribution: Eastern North America.

Fraxinus Ornus. European Manna Ash.

Location: Arboretum.

Natural distribution: Southern Europe and western Asia.

Fraxinus pennsylvanica. Red Ash.

Location: Arboretum. Wild.

Natural distribution: Eastern North America.

Fraxinus pennsylvanica var. **lanceolata.** GREEN ASH.
Location: Arboretum.
Fraxinus profunda. PUMPKIN ASH.
Location: Arboretum.
Natural distribution: South Central United States.
Fraxinus quadrangulata. BLUE ASH.
Location: Arboretum. Near fountain at foot of Museum approach.
Natural distribution: Eastern United States.
Fraxinus rotundifolia. ROUND-LEAVED ASH.
Location: Fruticetum.
Natural distribution: Southern Europe and western Asia.
Fraxinus texana. TEXAN ASH.
Location: Along road from Museum to South Gate.
Natural distribution: Texas.

NOTES, NEWS AND COMMENT.

There has recently been installed in the economic museum at the Garden an educational exhibit of ivory-pyralin, presented by the E. I. DuPont de Nemours Company of Wilmington, Delaware. Pyralin is the trade name of a substance very similar to celluloid and is purely a plant product. The basic substance in its manufacture is cotton, the cellulose of which is dissolved in acid, mixed with camphor, which is also a plant product, and made into a dough-like substance which can be molded into almost any form. Pyralin is used in the manufacture of combs, brushes, mirror backs, and other household utensils too numerous to mention. The white form is a close imitation of ivory, and with the use of proper pigments a form is made to represent tortoise shell. Transparencies are also made, such as those used in the curtains of automobiles.

Dr. Florence A. McCormick, of the Connecticut Agricultural Experiment Station, recently spent a day in the library studying the literature of the white pine blister rust.

Dr. Marshall A. Howe lectured September 24 on "Dahlias and Their Culture" before the North Country Garden Club at the home of Mr. W. J. Matheson, Huntington, Long Island. Mr. Matheson, who is a member of the Board of Managers of the Garden, has a choice collection of dahlias and has been a frequent prize-winner at exhibitions in New York City and vicinity. He has also been a generous donor of roots to the dahlia border at the Garden, contributing 94 varieties when the border was started in the spring of 1918.

A maple tree, furnished by the Garden, was planted at New York University, University Heights, The Bronx, on the occasion of the conferment of an honorary degree of Doctor of Letters upon Cardinal Mercier on the afternoon of October 8, 1919.

Dr. A. B. Stout, Director of the Laboratories, recently spent some time at Geneva, N. Y., where he inspected the collection of grapes on the grounds of the experiment station in connection with his studies on sterility in plants.

Dr. A. S. Hitchcock, of the Division of Agrostology at Washington, sailed October 4 for a six-months collecting trip in British Guiana. On this expedition he will pay chief attention to the grasses, a group in which he has specialized for years. His work is a portion of the tripartite exploration of northern South America, undertaken by the National Herbarium, the Gray Herbarium, and the New York Botanical Garden, and a set of his collections will be deposited in the Garden herbarium.

Owing to the increased cost of publication, the subscription price of *Mycologia* has been advanced to four dollars per year, taking effect at the beginning of 1920. The same price will also apply in the purchase of back volumes, which can still be supplied in complete sets.

Central Display House (right) at Conservatory Range 2

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THE NEW GREENHOUSES PRESENTED BY MESSRS. DANIEL GUGGENHEIM AND MURRY GUGGENHEIM

[WITH PLATES 239 AND 240]

On April 19, 1917, in a report of the Endowment Committee to the Board of Managers upon the further development of the Garden,* record was made of the generous gifts by Messrs. Daniel Guggenheim and Murry Guggenheim of $50,000 each for the construction of the Central Display Greenhouse and an Orchid Greenhouse at Public Conservatory Range 2, on the eastern side of the grounds north of the Allerton Avenue entrance. The recent completion of these elegant and useful structures may now be recorded.

Soon after the gifts of money were made, working drawings and specifications were prepared by Mr. John R. Brinley, landscape engineer, and his assistant, Louis F. Bird, and the plans having meanwhile been approved by the Municipal Art Commission, bids for the structural work were submitted to contractors for proposals; all excavation, filling and grading, as well as driveway and path approaches, interior paths, tanks and brooks, benches, and the building of a large additional coal-bunker at the power house have been accomplished by mechanics and laborers working under the direction of Arthur J. Corbett, superintendent of buildings and grounds, and John Finley, foreman gardener.

For the contract work, bids from the following firms were accepted:

* Journal 18: 121–125.

1. Masonry, concrete, drainage and water-supply: Joseph Havender, Woodlawn, New York.

The contractor was required to use building stone of high quality obtained in the course of grading operations, including the removal of a large ledge of rock which stood between the building site and the Bronx Boulevard, within two hundred feet of the work. The excavations also supplied a large quantity of high-quality building sand.

2. Heating, including installation of an additional 150 horse-power steam boiler in the power house: The Johnston Heating Company, New York.
3. Superstructures: The King Construction Company, North Tonawanda, New York.

The three contracting firms worked well together; there were occasional delays in adjusting the progress of masonry and concrete to other elements of the work, but these were overcome by persuasion. More extensive delays were encountered in the delivery of building material for the superstructure caused by war conditions, and the contract time had to be repeatedly extended. The contracts were all finally completed and the work accepted in July, 1919, leaving interior grading, benching and planting to be done.

During the Spring Inspection of Grounds, Building and Collections on May, 1919, members of the Garden and guests visited the new greenhouses, and bronze tablets, commemorating the gifts of the Messrs. Guggenheim were unveiled.*

During the autumn months of 1919, nearly all interior work contemplated was accomplished and plants were moved into the Central Display Greenhouse during the latter part of October and the first part of November and arranged under the direction of George V. Nash, head gardner and H. W. Becker, foreman gardner. This structure was opened to the public on the afternoon of November 8, with appropriate ceremonies, including addresses by Dr. W. Gilman Thompson, president of the Garden, by Dr. D. T. MacDougal, director of botanical research, Carnegie Institution of Washington, and by Dr. N. L. Britton,

* Journal **20**: 114–115.

director-in-chief of the Garden. A large and beautiful display of plants and flowers was installed in coöperation with the Horticultural Society of New York, and suitable prizes awarded from the income of the William R. Sands Fund.

A noteworthy feature of the Central Display Greenhouse is provision within it of space for lectures, meetings and special displays, facilities for which have long been needed. At the suggestion of President Thompson, the plans were drawn so as to provide a central space with a reinforced concrete floor over a commodious cellar, upon which audiences of about 200 persons may be comfortably seated. This was at once taken advantage of and public lectures were delivered as follows:

November 15. Cycads and Sago Palms, by Dr. N. L. Britton.

November 22. Tropical Orchids, by Mr. George V. Nash.

November 29. Tropical Ferns and Their Relatives, by Dr. H. A. Gleason.

Other series of lectures will follow. The arrangements proved wholly satisfactory and the surroundings, formed of palms, are unique and beautiful.

The permanent planting of the two ends of the Central Display House will be chosen from plants of warm-temperate and subtropical regions. The collections primarily installed have been taken from House 13 of Public Conservatory Range 1, where the plants have been greatly crowded for several years; this House 13 will now be largely occupied by palms drawn from House 1, also overcrowded.

The greenhouse for orchids, much smaller than the Central Display House, will provide abundant space for the orchid collection as now constituted, as well as for its increase; it is desirable that this collection be increased whenever funds for the purchase of orchid plants become available. It is proposed to install the collection, now in other greenhouses, during the winter or spring.

THE ELM LEAF BEETLE

The statement was made in 1905 that this imported insect was in all probability responsible for more ruined elm trees in the Hudson River valley than all other destructive agencies combined. Certainly the same statement could be applied with equal truth to the Connecticut River valley and doubtless to many other localities where the insect has been established.

It is thought that the beetle was introduced into this country about 1834, and since that time many thousands of elms have been killed by its repeated attacks. While individual insects do not fly far, the spread of the species has been comparatively rapid, and its history and destructiveness is too well known to deserve extensive discussion.

A few seasons ago attention was attracted to the sudden subsidence of the beetle at the New York Botanical Garden. So rare had it become that it was difficult to locate a single individual. This sudden disappearance was quite naturally attributed to local activity in the application of sprays. Inquiry soon disclosed the fact that similar conditions had been noted in Massachusetts, New Jersey, and other parts of New York and by the writer's personal observations in the Connecticut River valley. Each locality attributed the sudden decrease or complete disappearance of the insect to its own efforts in the use of control measures. In the Connecticut valley, however, the beetle disappeared from large trees which had been badly infested and had never been sprayed, so that its disappearance could not have been due entirely to artificial control but probably to some unfavorable natural condition or the sudden appearance of some natural enemy.

While spending a vacation at Portland, Connecticut, in the summer of 1919, the writer noticed that the elm leaf beetle, which had been conspicuous by its absence during the four preceding years, had reappeared in such numbers that by the end of July the leaves of many trees had been completely skeletonized and were beginning to turn brown.

Later in the season the trees in the New York Botanical Garden

were inspected and found to be still free from the insect as far as could be determined from a superficial examination from the ground. From these observations the conclusion may be drawn that the elm leaf beetle is reappearing, but only in localized areas. A careful inspection of elm trees should be made and spraying resumed wherever necessary with the hope of being able to assist nature in keeping the insect from attaining its former destructiveness.

F. J. SEAVER

THE LOTUS OF ANCIENT EGYPT

There were two species of "lotus" known to the ancient Egyptians, one with white and the other with blue flowers. Both were true water-lilies, with heart-shaped leaves that rested on the surface of the water; and both were held sacred as symbolic of the creation.

The plant known in America as the "Egyptian lotus" is not a true water-lily, but a Nelumbo, having tall circular leaves, pink flowers, and peculiar pitted fruits containing small nuts. It was held sacred in India, China, and Japan.

I have looked through all the collections at the Metropolitan Museum of Art and have not found this latter plant, the oriental lotus, used as a decorative motive by the ancient Egyptians. What I have found is mostly the blue lotus, *Castalia coerulea*, and rarely the white lotus, *Castalia Lotus*.

The true Egyptian lotus was one of the oldest, as well as one of the most beautiful, plant motives ever used. It grew abundantly in the valley of the Nile and was employed by the Egyptians, together with the papyrus and palm, in many forms of decorative art.

Neither the true lotus of ancient Egypt nor the sacred lotus of the Orient must be confused with the plant referred to in Tennyson's poem, which was the jujube, a prickly shrub bearing fruits resembling a plum or date and much used as a dessert. Homer describes the wandering Ulysses as arriving at the coast of Libya, where many of his sailors partook of the jujube fruits and immediately lost their desire to return to home and friends.

W. A. MURRILL

HARDY WOODY PLANTS IN THE NEW YORK BOTANICAL GARDEN

(Continued)

Forsythia. GOLDEN-BELL

Forsythia europaea. EUROPEAN GOLDEN-BELL.

Location: Fruticetum.

Natural distribution: Albania.

Forsythia Fortunei. FORTUNE'S GOLDEN-BELL.

Location: Fruticetum. Near plaza, Harlem Railroad depot.

Natural distribution: China.

Forsythia Fortunei var. **atrocaulis.** FORTUNE'S DARK-STEMMED GOLDEN-BELL.

Location: Fruticetum.

Natural distribution: Central China.

Fraxinus Fortunei var. **aureo-variegata.** FORTUNE'S VARIEGATED GOLDEN-BELL.

Location: Fruticetum.

Horticultural origin.

Forsythia Fortunei var. **pubescens.** FORTUNE'S HAIRY-LEAVED GOLDEN-BELL.

Location: Fruticetum.

Natural distribution: Central China.

Forsythia intermedia. HYBRID GOLDEN-BELL.

Location: Fruticetum. Near plaza, Harlem Railroad depot Opposite entrance to elevated railroad.

Hybrid.

Forsythia intermedia var. **primulina.** PRIMROSE HYBRID GOLDEN-BELL.

Location: Fruticetum.

Forsythia intermedia var. **vitellina.** DEEP-COLORED HYBRID GOLDEN-BELL.

Location: Fruticetum.

Forsythia suspensa. WEEPING GOLDEN-BELL.

Location: Fruticetum.

Natural distribution: China.

Forsythia viridissima. DARK-GREEN GOLDEN-BELL.

Location: Fruticetum. Near plaza, Harlem Railroad depot.

Natural distribution: China.

Forsythia viridissima var. **variegata.** VARIEGATED DARK-GREEN GOLDEN-BELL.

Location: Fruticetum.

Horticultural origin.

Syringa. LILAC

Syringa amoena. BEAUTIFUL LILAC.

Location: Lilac Garden.

Horticultural origin.

Syringa amurensis, MANCHURIAN LILAC.

Location: Fruticetum.

Natural distribution: Manchuria.

Syringa azurea var. **plena.** DOUBLE BLUE LILAC.

Location: Lilac Garden.

Horticultural origin.

Syringa chinensis. ROUEN LILAC.

Location: Fruticetum. Lilac Garden.

Horticultural origin.

Syringa chinensis var. **alba.** WHITE ROUEN LILAC.

Location: Fruticetum. Lilac Garden.

Syringa chinensis var. **Saugeana.** RED ROUEN LILAC.

Location: Fruticetum.

Syringa colmariensis. COLMAR LILAC.

Location: Lilac Garden.

Horticultural origin.

Syringa Emodi. HIMALAYAN LILAC.

Location: Fruticetum.

Natural distribution: Himalayan Region.

Syringa japonica. JAPANESE LILAC.

Location: Fruticetum.

Natural distribution: Japan.

Syringa Josikaea. HUNGARIAN LILAC.

Location: Fruticetum.

Natural distribution: Hungary.

Syringa Juliana. JULIANA'S LILAC.

Location: Fruticetum.
Natural distribution: Western China.

Syringa Komarowii. KOMAROW'S LILAC.
Location: Fruticetum.
Natural distribution: Western China.

Syringa macrostachya. LARGE-CLUSTERED LILAC.
Location: Lilac Garden.
Horticultural origin.

Syringa Noisettiana var. **alba.** WHITE NOISETTE LILAC.
Location: Lilac Garden.
Horticultural origin.

Syringa oblata. LINDLEY'S LILAC.
Location: Lilac Garden.
Natural distribution: Northern China.

Syringa pekinensis. PEKIN LILAC.
Location: Fruticetum.
Natural distribituon: Northern China.

Syringa persica var. **alba.** WHITE PERSIAN LILAC.
Location: Fruticetum.
Natural distribution: Caucasus to Afghanistan.

Syringa persica var. **laciniata.** CUT-LEAVED PERSIAN LILAC.
Location: Fruticetum.

Syringa pubescens. PUBESCENT LILAC.
Location: Fruticetum.
Natural distribution: Northern China.

Syringa reflexa. PENDULOUS LILAC.
Location: Fruticetum.
Natural distribution: Western China.

Syringa spectabilis. SHOWY LILAC.
Location: Lilac Garden.
Horticultural origin.

Syringa tomentella. LITTLE HAIRY LILAC.
Location: Fruticetum.
Natural distribution: Western China.

Syringa villosa. HAIRY CHINESE LILAC.
Location: Fruticetum.
Natural distribution: China to Himalayas.

Syringa vulgaris. COMMON LILAC.

Location: Fruticetum. Power house 1.

Natural distribution: Southeastern Europe to Caucasus.

Syringa vulgaris var. **alba.** WHITE-FLOWERED COMMON LILAC.

Location: Fruticetum.

Syringa Wilsonii. WILSON'S LILAC.

Location: Fruticetum.

Natural distribution: Western China.

The following, many of them hybrids, of horticultural origin, are also in the collections:

Aline Macquery, Antoine Buchner, Arthur Wm. Paul, Banquise, Bleuatre, Charles Baltet, Charles Sargent, Charles X, Comte de Kerchove, Comtesse Horace de Choisseul, De Jussieu, De Mirabel, De Saussure, Desfontaines, Dr. Maillot, Dr. Masters, Duc de Massa, Edmond About, Edmond Boissier, Emile Lemoine, Erherzog Johann, Etoile de Mai, Fürst Lichtenstein, Georges Bellair, Gloire de Lorraine, Godroy, Henri Martin, Hippolyte Maringer, Jeanne d'Arc, Jules Ferry, Jules Simon, La Mauve, Lamartine, Leon Gambetta. Lilarosa, Louis Van Houtte, Mme. Antoine Buchner, Mme. Casimir Perier, Mme. Lemoine, Mme. de Miller, Mme. Moser, Marechal Lannes, Marliacea pallida, Maximowicz, Merveille, Michel Buchner, Mirabeau, Miss Ellen Willmott, Montaigne, Montgolfier, Negro, Olivier de Serres, Pasteur, Paul Hariot, Philemon, Planchon, President Fallieres, President Grevy, President Loubet, President Viger, Princess Alexandra, Prof. Sargent, Prof. Stockhart, Rousard, Siebold, Souv. de L. Thibaut, Taglioni, Tournefort, Toussaint l'Ouverture, Vestale, Victor Lemoine, Viviand Morel, Volcan, Waldeck Rousseau, Wm. Robinson.

Phillyrea. PHILLYREA

Phillyrea angustifolia. NARROW-LEAVED PHILLYREA.

Location: Fruticetum.

Natural distribution: Mediterranean Region.

Forestiera. FORESTIERA

Forestiera acuminata. POINTED FORESTIERA.

Location: Fruticetum.

Natural distribution: Southeastern United States.

CONFERENCE NOTES FOR NOVEMBER

A conference of the scientific staff and registered students of the Garden was held on the afternoon of November 5.

Dr. P. A. Rydberg presented the results of recent studies of the genus *Harpalyce*, as follows:

"The genus *Harpalyce* was described by De Candolle from an unpublished illustration of Mocino and Sesse's *Astragalus carnosus*. Sesse and Mocino's manuscript Flora Novae Hispaniae was later published in Mexico some years ago and in it is found an *Astragalus formosus*. As De Candolle named the type species *Harpalyce formosa*, it is to be assumed that '*carnosus*' was a misprint for *formosus*. This species has remained unknown except through these meager original descriptions, tracings of Mocino and Sesse's drawings, and a reproduction of one of these published by Bentham in Hooker's Journal of Botany. Several species which evidently belong to the same genus have been collected in Mexico, Guatemala, Cuba, and Brazil, but none of these can be identified with *Harpalyce formosa*. The genus can be divided into four groups:

"1. One species from Mexico: *H. mexicana*, which has broad, thick, and woody pods and grayish pubescence, while all the other species have leathery pods and more or less ferruginous pubescence. The flowers of this species are unknown.

"2. Six species from Mexico: *H. formosa*, *H. Goldmanii*, *H. Loesneriana*, *H. hidalgensis*, *H. arborescens*, and *H. Pringlei;* and one from Guatemala: *H. rupicola*, in which the petals are subequal, the keel-petals strongly incurved and free at the tip, and the pods are broad, rather few-seeded, and sometimes only with traces of partitions between the seeds.

"3. Three Brazilian species: *H. brasiliana*, *H. Hilairiana*, and *H. minor*, with flowers similar to those of the second group, but the keel less curved and the pods so far as known with many seeds separated by false partitions.

"4. Three Cuban species: *H. cubensis* and two closely related undescribed species, in which the petals are more fleshy and very unequal, the keel-petals being two to three times as

long as the banner and wings, only slightly falcate, and united to the apex."

Dr. H. A. Gleason spoke on "Variation in Flower-number in Vernonia," presenting the results of studies which have since been published in the *American Naturalist.*

"In many species of *Vernonia*, in which the number of flowers in each head is less than ten, the numbers of the Fibonacci series are followed exactly. In other species with larger heads, there is a close approximation to the Fibonacci series, with more or less variation in both directions. Detailed studies of conditions in *Vernonia missurica* Raf. show that the species presents a great variation in flower-number, with observed extremes of 22 and 62. On plants with heads sufficiently numerous to warrant drawing conclusions, the mode falls on or near a number of the Fibonacci series, usually 34, but in plants with relatively few heads this agreement may not appear. For each plant, the flower-number is quite constant, but is regularly slightly greater in the terminal head of each primary cyme."

A. B. STOUT,
Secretary of the Conference

NOTES, NEWS AND COMMENT

Mr. Kenneth R. Boynton, who has been acting as marshal of the garden school, has been appointed supervisor of gardening instruction, succeeding Captain Henry G. Parsons, resigned.

Miss Marjorie F. Warner, a librarian at The Bureau of Plant Industry, Washington, recently spent a week at the Garden studying the literature of Horticulture prior to 1800.

The following scientists have recently registered in the library: Professor A. S. Hitchcock, Dr. J. N. Rose, Dr. Neil E. Stevens, and Dr. Charles D. Walcott, Washington, D. C.; Mr. Ralph Hoffmann, Stockbridge, Mass.; Mr. A. H. Cockayne, Werawa, New Zealand, and Miss Annie Lorenz, Hartford, Conn.

Mr. Hugh Findlay, author of "Practical Gardening," organizer and inspector of camp farms for the United States army, and later field lecturer in agriculture overseas, has registered as a research student at the Garden.

Prof. N. E. Hanson, of South Dakota, called at the Garden November 8, en route to North Carolina. The object of his trip is to secure specimens of *Rubus Millspaughii*, a spineless blackberry, to be used in breeding experiments.

Dr. L. H. Bailey, of Ithaca, New York, who is now identifying his collections of Chinese plants, visited the Garden November 12.

Prof. and Mrs. A. H. Cockayne, of New Zealand, spent some time at the Garden and at other New York institutions in October and November. Prof. Cockayne, who is the government biologist of New Zealand, is accumulating data on agricultural and scientific education and organization during a six months leave of absence. He is the son of Dr. L. Cockayne, the well-known New Zealand ecologist.

The dahlia border, which attracted hundreds of enthusiastic visitors for a period of three months, was cut down by frost on the morning of November 10, three days later than the first killing frost of the previous autumn. While in perfection of individual flowers the border was no more notable than last year, it was more remarkable in profusion of blooming and in general effectiveness, due probably to the copious rainfall of summer and autumn and to the absence of extended periods of extremely high temperatures. Twenty-four choice novelties contributed by J. J. Broomall of Eagle Rock, California, constituted a striking feature of this year's exhibit.

An extensive collection of specimens from the Rio Grande Valley, Texas, has recently been received for the herbarium. This valuable addition to our permanent collection came through Mr. H. C. Hanson who gathered the specimens while working in that botanically little known part of the United States.

A large collection of specimens of rare and interesting plants of Cuba has been received from Brother Leon. The specimens are being incorporated in the Garden herbarium.

A specimen of the rare *Anthurus borealis* Burt was brought in by Mr. Boynton on October 31, 1919, from the Gladiolus bed in the Garden grounds, where the students of the Garden School discovered it. This interesting stinkhorn is divided at the top into six narrow, hollow arms. It was first brought to our attention in May, 1911, by Dr. F. M. Bauer, who found it growing in quantity in mushroom beds on Blackwell's Island. So far as known, Mr. Boynton's specimen is the first ever collected within the New York Botanical Garden.

Several minor changes and replacements of defective stock have been made in the rose garden during the autumn. Most of these have been necessitated by inferior stock upon which some varieties of hybrid tea roses have been propagated.

The number of students in the course of instruction in gardening has steadily increased during the autumn months, until thirty-five were registered November 25. For convenience of instruction in practical work, they have been divided into three groups, while all meet together for class work. Dr. W. J. Gies has delivered lectures weekly on elementary chemistry and classes in elementary botany and garden botany are also in progress.

Meteorology for September. The total precipitation for the month was 2.85 inches. The maximum temperatures recorded at the Garden for each week were *95° on the 7th and 8th*, 83° on the 21st, and 79° on the 22d. The minimum temperatures were 52° on the 5th, 51° on the 13th, 45° on the 19th, and *42° on the 27th*.

Meteorology for October.—The total precipitation for the month was 2.65 inches. The maximum temperatures recorded at the Garden for each week were *90° on the 4th*, 86° on the 11th,

78° on the 16th, 67° on the 26th and 84° on the 28th. The minimum temperatures were 48° on the 1st, *35° on the 13th*, 39° on the 19th, and 41° on the 23d.

ACCESSIONS

LIBRARY ACCESSIONS FROM AUGUST 22 TO NOVEMBER 21.

BLUME, CARL LUDWIG VON, & FISCHER, JOHANN BAPTISTA VON. *Flora Javae nec non insularum adjacentium.* Bruxelles, 1828 (Given by Dr. Louise M. Browne.)

The Catholic encyclopedia. Vol. 16. Index. New York, c 1914. (Given by The Encyclopedia Press.)

CHAMBERLAIN, CHARLES JOSEPH. *The living cycads.* Chicago, 1919.

GRANT, E. B. *Beet-root sugar and the cultivation of the beet.* Boston, 1867. (Given by Dr. J. H. Barnhart.)

KAUFFMAN, CALVIN HENRY. *The Agaricaceae of Michigan.* 2 vols. Lansing 1918. (Given by Michigan Geological and Biological Survey.)

LLOYD, JOHN WILLIAM. *Productive vegetable growing.* Ed. 3. Philadelphia, [1918].

MACGILLIVRAY, WILLIAM. *A systematic arrangement of British plants by W. Withering . . . corrected and condensed by William Mcgillivray.* Ed. 5. London, 1841. (Given by Mrs. N. L. Britton.)

MONTGOMERY, EDWARD GERRARD. *Productive farm crops.* Ed. 2. Philadelphia, [1918].

RADDI, GUISEPPE. *Synopsis filicum brasiliensium,* [Bologna, 1819] Photographic copy. (Given by The Library of Congress.)

Scientific American. Vol. 120. New York, 1919. (Given by Scientific American Publishing Co.)

SEARS, FRED C. *Productive orcharding.* Ed. 2 rev. Philadelphia, 1919.

SEDGWICK, WILLIAM THOMPSON, & WILSON, EDMUND BEECHER. *General Biology.* Ed. 2 New York, 1904. (Given by Miss S. H. Harlow.)

VAN SLYKE, LUCIUS LINCOLN. *Fertilizers and crops.* New York, 1919.

VELENOVSKY, JOSEF. *Květena českéhocenomanu.* Prague, 1889. (Given by Dr. A. Hollick.)

MUSEUMS AND HERBARIUM

1 specimen of *Lepiota americana* from New York. (Collected by Dr. J. H. Barnhart.)

2 specimens of woody fungi from Connecticut. (By exchange with Dr. A. H. Graves.)

1 specimen of *Boletinellus merulioides* from New Hampshire. (By exchange with Mr. W. H. Shell.)

1 specimen of *Grifola Berkeleyi* from Alabama. (By exchange with Mr. J. E. Fries.)

34 specimens of fungi from Virginia. (Collected by Dr. W. A. Murrill.)

1 specimen of *Spongipellis fissiles* from Minnesota. (By exchange with Miss F. Jean MacInnes.)

12 specimens of boletes from Connecticut. (By exchange with Prof. H. L. Wells.)

3 specimens of fungi from Colorado. (By exchange with Prof. E. Bethel.)

1 specimen of *Typhodium typhinum* from Yosemite Valley. (By exchange with Prof. W. C. Blasdale.)

2 specimens of fungi from Connecticut. (By exchange with Dr. Robert L. Morris.)

2 specimens of *Ganoderma sessile* from New Jersey. (By exchange with Mr. Edwin Fowler.)

1 specimen of *Chlorosplenium aeruginosum* from Pennsylvania. (By exchange with Master R. Delafield.)

2 specimens of fungi from Minnesota. (By exchange with Miss F. Jean MacInnes.)

1 specimen of *Lycoperdon rubroflavum* from the New York Botanical Garden. (Collected by Miss M. E. Eaton.)

3 specimens of fungi from Pennsylvania. (By exchange with Mrs. V. W. Delafield.)

4 specimens of fleshy fungi from Connecticut. (By exchange with Dr. R. L. Morris.)

3 specimens of discomycetes from New York. (By exchange with Mr. Chardon.)

6 specimens of discomycetes from New York. (Collected by Dr. F. J. Seaver.)

1 specimen of *Pholiota* from Montana. (By exchange with Prof. P. W. Graff.)

1 specimen of *Inonotus amplecteus* from Florida. (By exchange with Dr. G. Clyde Fischer.)

2 specimens of *Melanoleuca pallida* from Connecticut. (By exchange with Dr. R. T. Morris.)

2 specimens of *Spongipellis* from Minnesota. (By exchange with Mr. Freeman Weiss.)

1 specimen of *Grifola flavorivens* from Wisconsin. (By exchange with Mrs. M. Guinotts).

6 specimens of fungi from Ontario. (By exchange with Dr. H. A. Kelley.)

2 specimens of fleshy fungi from New York Botanical Garden. (Collected by Mr. Felix F. Wilmousky.)

1 specimen of *Stropharia* from Canada. (By exchange with Prof. J. H. Faull.)

6 specimens of fungi from California. (By exchange with Dr. Arthur S. Rhoads.)

1 specimen of *Calostoma cinnabarinum* from Lake Mohonk, New York. (Collected by Dr. N. L. Britton.)

6 specimens of fungi from Stamford, Connecticut. (Collected by Dr. T. Morris and Dr. W. A. Murrill.)

1 specimen of *Auriscalpium Auriscalpium* from New York. (By exchange with Mrs. W. C. Smith.)

6 specimens of *Geaster hygrometricus* from The New York Botanical Garden. (Collected by Mr. H. W. Becker.)

2 specimens of fungi from Ohio. (By exchange with Mr. W. R. Lowater.)

1 specimens of *Crepidotus malachias* from Minnesota. (By exchange with Miss F. Jean Maclunes.)

3 specimens of fungi from Kentucky. (By exchange with Prof. Frank L. McFarland.)

3 specimens of fungi from Cuba. (By exchange with Brother Hioram.)

2 specimens of fungi from Ithaca, New York. (By exchange with Prof. H. M. Fitzpatrick.)

1 specimen of *Peziza sylvestris* from Pennsylvania. (By exchange with Dr. L. O. Overholts.)

1 specimen of *Funalia stuppea* from Minnesota. (By exchange with Mr. Freeman Weiss.)

100 specimens, "Mycotheca Boreali-Africana" fascicles 13, 14, 15, 16. (Distributed by Rene Maire.)

3 specimens of *Persicaria*. (Given by Mr. William C. Ferguson.)

5 specimens of *Callitricha heterophylla* from New York. (Given by Dr. Romyn Hitchcock.)

9 specimens of Hepaticae from New England. (By exchange with Miss Annie Lorenz.)

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